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# ***JPRS Report***

# **Science & Technology**

***USSR: Life Sciences***

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# Science & Technology

## USSR: Life Sciences

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**Antistress Action of Kartolin-2 on Barley Sprouts in Heat Shock**

917C0370A Moscow DOKLADY VSESOYUZNOY ORDENA LENINA I ORDENA TRUDOVOGO KRASNOGO ZNAMENI AKADEMII SELSKOKHOZYAYSTVENNYKH NAUK IMENI V. I. LENINA in Russian No 11, Nov 90 (manuscript received 25 Feb 90) pp 8-11

[Article by D. P. Yefremov and O. N. Kulayeva, Institute of Plant Physiology imeni K. A. Timiryazeva, USSR Academy of Sciences]

UDC 577.175.149

[Abstract] The antistress effect produced by kartolin-2, a synthetic bioregulator that raises cell and plant resistance to high temperatures and drought, was studied in a test system in which etiolated Winer barley sprouts were kept at 45°C for one hour. The work was performed in 1987-1989. When used to treat seeds or sprouts, kartolin-2 was found to reduce the inhibiting effect of heat stress substantially. Its protective effect grew with increasing concentration and was most effective at  $10^{-4}$  M, which was equivalent to  $(3-4) \times 10^{-7}$  g/plant or 2 g/200 kg seeds/hectare. In the control plants, raising temperature to 45°C from 30° reduced protein synthesis in sprout roots. Kartolin-2, on the other hand, boosted protein synthesis in the roots by a factor of 2. The researchers caution that the preparation must be used before the onset of heat shock. Figures 2; references 9: 8 Russian, 1 Western.

**Toxigenicity of *Fusarium graminearum* Schw. Isolates From Fusarial Wheat Grain in the Krasnodar Kray**

917C0370B Moscow DOKLADY VSESOYUZNOY ORDENA LENINA I ORDENA TRUDOVOGO KRASNOGO ZNAMENI AKADEMII SELSKOKHOZYAYSTVENNYKH NAUK IMENI V. I. LENINA in Russian No 11, Nov 90 (manuscript received 4 Apr 90) pp 21-26

[Article by A. N. Leonov, L. S. Malinovskaya, N. A. Soboleva, and G. P. Kononenko, All-Union Scientific Research Institute of Veterinary Sanitation]

UDC 633.11:582.28

[Abstract] A total of 73 isolates of *F. graminearum* Schw. were studied for toxigenic properties. The isolates were from 36 wheat grain samples taken from farms in nine rayons of Krasnodar Kray, which was enveloped in a widespread epidemic of Fusarium wilt in 1985-1988. The researchers found that, among the fungi of the genus *Fusarium* that affected wheat crops in that period, *F. graminearum* was predominant, and 95.9 percent was toxigenic. The principal population in terms of toxigenesis was a population capable of biosynthesizing zearalenone and/or deoxynivalenol, i.e., 90 percent of the

isolates. The ability to form deoxynivalenol was especially pronounced in that group, with half the population superproducers at a level of synthesis of more than 3.0 mg/g. The researchers predict that if there is a repeat of epiphytotic Fusarium wilt in that region, the grain will probably be contaminated mainly by deoxynivalenol. References 10: 3 Russian, 7 Western.

**Fattening Ability and Quality of Meat in Stress-Resistant and Stress-Sensitive Pigs**

917C0370C Moscow DOKLADY VSESOYUZNOY ORDENA LENINA I ORDENA TRUDOVOGO KRASNOGO ZNAMENI AKADEMII SELSKOKHOZYAYSTVENNYKH NAUK IMENI V. I. LENINA in Russian No 11, Nov 90 (manuscript received 26 Mar 90) pp 43-47

[Article by L. V. Timofeyev and V. N. Lukyanov, Moscow Agricultural Academy imeni K. A. Timiryazev]

UDC 636.4:636.084.522.2

[Abstract] Piglets 6 to 7 weeks old were divided into two groups on the basis of their reaction to fluorothane, with those exhibiting a negative reaction judged to be stress-resistant. By comparison with the stress-sensitive pigs, the stress-resistant animals grew faster and were fattened quicker, i.e., they reached a live weight of 100 kg by an average of 4.4 days sooner. Average daily growth was higher in the latter animals by 53 g, or 6.5 percent. The amount of feed needed for both groups of animals was identical. The researchers estimated that an average of 17 rubles per head was saved with the stress-resistant pigs. The meat from the animals was evaluated in terms of moisture-containing ability of muscle, pH, color, and storage loss. The carcasses of the stress-resistant pigs had less storage loss over a 24-hour period and had higher pH, which promotes retention of moisture-containing ability and better color and indicates fewer PSE and DFD flaws. References 6: Russian.

**Technologies for Nondefoliating Machine Picking of Raw Cotton**

917C0370D Moscow DOKLADY VSESOYUZNOY ORDENA LENINA I ORDENA TRUDOVOGO KRASNOGO ZNAMENI AKADEMII SELSKOKHOZYAYSTVENNYKH NAUK IMENI V. I. LENINA in Russian No 11, Nov 90 (manuscript received 18 Apr 90) pp 59-61

[Article by A. D. Glushchenko and M. T. Tashboltayev, Institute of Structural Mechanics and Seismic Stability imeni M. T. Urazbayev, UkSSR Academy of Sciences]

UDC 633.51:631.558.5

[Abstract] Since cotton pickers are more efficient when the plants have no green leaves, defoliantes are used to

remove the green mass before harvest. Defoliant, however, are highly toxic, and experts estimate that defoliation accounts for 15 percent of the cost of machine harvesting. The researchers here tested five variations for a cotton-harvesting operation and concluded that the most promising technology involves nondefoliating procedures, because there is no free fiber and the fibers are more mature. The operation they recommended consisted of two-pass shaping of the plants to make them more accessible to the machines, collection of the green mass, and, for higher fiber yield, machine harvest of the cotton after (as opposed to before) light fall frosts, plus air drying of the raw cotton in the field before it is sent to the processing point. References 5: Russian.

**Antibiotic Herbicide Bialaphos: Stages and Genetic Monitoring of Biosynthesis; Development of Plants Resistant to Bialaphos**

917C0476A Moscow ANTIBIOTIKI I  
KHIMIOTERAPIYA in Russian Vol 36 No 2, Feb 91  
(manuscript received 12 Mar 90) pp 3-6

[Article by N. D. Lomovskaya, N. M. Mkrtumyan, and G. V. Sezonov, All-Union Scientific Research Institute for the Genetics and Breeding of Commercial Microorganisms, Moscow]

UDC 615.33.017:615.285.7].015.44.076.7

[Abstract] The use of antibiotics as pesticides has been the subject of numerous studies in view of the fact that antibiotic pesticides are more biodegradable and less polluting than conventional pesticides. This paper presents some recent data on bialaphos (sodium salt of L-2-amino-4-[(hydroxy)(methyl)(phosphinoyl)]-butyryl-L-alanyl-L-alanine), a non-selective, ecologically safe herbicide with a broad spectrum of action that is produced by the secondary metabolism of *Streptomyces viridochromogenes* Tu 494 and *S. hygroscopicus* ATCC 2175. The variety of approaches employed to identify the bialaphos biosynthesis pathway includes the use of <sup>13</sup>C-labeled atoms to determine the carbon atom source for the bialaphos molecule skeleton and the use of metabolic inhibitors to accumulate intermediate substances of biosynthesis. The results of several studies have demonstrated that the *bap*, *bar*, and *brp* genes are responsible for most of bialaphos synthesis, which involves at least 13 steps. In an effort to make agricultural crops more resistant to bialaphos, researchers inserted a product of the *bar* gene isolated from *S. hygroscopicus* that is specific for the substrate and confers resistance upon any plant. Varieties of tobacco (*Nicotiana tabacum*) have also been made resistant to phosphinothricin by using the *pat* gene from *S. viridochromogenes* Tu 494. References 40: 5 Russian, 35 Western.

**Conformational Features of Biologically Active Analogs of Melanostatin**

917C0359A Moscow BIOORGANICHESKAYA  
KHIMIYA in Russian Vol 16 No 12 Dec 90 (Signed to  
press 2 Jan 90) pp 1607-1617

[Article by Yu. Ye. Shapiro, V. Ya. Gorbatyuk, V. M. Kabanov et al.; Physico-Chemical Institute imeni A. V. Bogatskiy; UkSSR Academy of Sciences, Odessa]

UDC 577.175.32'17.012: 543.422.25

[Abstract] Two-dimensional spectroscopic  $^1\text{H}$  nuclear magnetic resonance studies revealed the conformation of melanocyte-inhibiting hormone [MIH] (Pro-Leu-Gly-NH<sub>2</sub> x HCl, MIH) in a DMSO-d<sub>6</sub> solution and 5 MIH analogs containing p-substituted phenylalanine. Use of multiple linear regression methods, assessed by the Porolt test, revealed the dependence of the antidepressant activity of MIH and its analogs on the structural features of their molecules after use of a 5.0-0.001 mg/kg dose. Spin-spin interaction which determines the torsion angles of  $\pi$ h and h of the second amino acid and angle  $\pi$ h of glycine were selected as structural parameters. A biologically active conformation (10-membered  $\beta$ -turn II) was shown for the compounds studied. Figures 5; references 17: 7 Russian, 10 Western.

**Use of Thiol Sorbents to Produce Recombinant Human Proinsulin**

917C0359B Moscow BIOORGANICHESKAYA  
KHIMIYA in Russian Vol 16 No 12, Dec 90  
(manuscript received 5 Apr 90) pp 1683-1686

[Article by I. V. Aleksyuk, A. S. Klimenko and V. A. Yefimov; Institute of Bioorganic Chemistry imeni M. M. Shemyakin; USSR Academy of Sciences; Moscow]

UDC 577.216.5+543.544.8

[Abstract] Studies of the use of thiol carriers (porous glass CPG/Thiol and NPS-silichrome) to immobilize hybrid protein in order to purify it and lysis of the immobilized protein by bromocyan and closure of the disulfide bonds in a molecule of immobilized proinsulin

made it possible to develop a scheme of insulin production. The scheme was diagrammed and discussed. The procedure, which may be used to develop a technology of human insulin production, is superior to other existing procedures. It decreases the number of chromatographic stages of purification of intermediate products, hybrid protein and proinsulin. It greatly decreases time spent on changing buffers during performance of some sequential reactions. Immobilization of the hybrid protein on the carrier solved the problem concerning the low solubility of the proteins and ensured complete albuminolysis by the bromocyan. The bromocyan can be reused. Use of a mixture of 0.2 n HCl and 6 M of guanidinedihydrochloride prevented loss of immobilized protein. The new method of closing disulfide bonds in the proinsulin molecule decreased the time required to perform several intermediate stages. Figures 2; references 11: 4 Russian, 7 Western.

**Nature of Post-Translation Modification of Common Species-Specific Outer Membrane Protein of Rickettsia prowazekii**

917C0359C Moscow BIOORGANICHESKAYA  
KHIMIYA in Russian Vol 16 No 12, Dec 90  
(manuscript received 15 Jul 90) pp 1687-1688

[Article by A. V. Rodionov; Institute of Epidemiology and Microbiology imeni N. F. Gamaleya; USSR Academy of Medical Sciences; Moscow]

UDC 579.222'112

[Abstract] Hydrolysis of outer membrane protein of Rickettsia prowazekii, subjected to post-translation modification, revealed three basic ninhydrin-like compounds (X, Y, Z). Comparison of the behavior of Z and methylamine under different conditions of chromatography on ion-exchangers BTC 2710 and DC 8-9 showed that these compounds coincide in time of retention regardless of composition of buffers, pH, temperature and elution regime. Compounds X and Y demonstrated the same behavior. The outer membrane protein of strain Brainl of Rickettsia prowazekii contained residues of N<sup>ε</sup> trimethyl lysine, N<sup>ε</sup> trimethyl lysine and monomethyl amides in quantities of 1.31, 1.26 and 1.38 nmoles respectively per 1 nmole of histidine. References 3: Russian.



**Devising Measles Vaccine in Cell Culture Grown on Microcarriers**

917C0484A Moscow BIOTEKHNOLOGIYA in Russian  
No 6, Nov-Dec 90 (manuscript received 15 Apr 88)  
pp 33-34

[Article by I. N. Zasorina, L. V. Dorofeyeva, L. L. Shteynberg, M. K. Klyavinsh, and Yu. S. Boriskin, Viral Preparations Scientific Research Institute, Moscow]

UDC 615.371.012

[Abstract] This article discusses the laboratory development of a method for producing a measles vaccine in a cell culture grown on microcarriers. The Leningrad-16 measles virus strain was grown on three types of microcarriers (Cytolar-2, Cytodex-2, and Mikartsel), with a primary trypsinated cell culture from 9- to 10-day-old Japanese quail embryos as the substrate. The results demonstrated that the number of viable cells gradually decreases as the cultivation period increases. The Mikartsel microcarriers were noted to have the highest number of viable cells, but the virus titer diminishes by 0.75 lg by days 7 to 8 and remains at that level, while the number of viable cells continues to decrease. The data also indicated that for the Mikartsel and Cytodex-2 microcarriers, the maximum virus titer is noted within the first few days, after which it gradually falls. However, for Cytolar-2, the virus titer gradually rises, peaking at days 6 to 8, after which it gradually falls. Results of comparing this method with conventional cultivation on rollers demonstrated that though the  $TCD_{50}$  is lower in cells grown on microcarriers, the virus titer peaks 1 to 2 days earlier. These findings indicate that a measles vaccine can be produced by growing the infected cells on microcarriers. In addition, a suspended cell culture grown on microcarriers is much more economical than conventional techniques of vaccine production. Figures 1; references 9: 2 Russian, 7 Western.

**Cultivating Intertwining Mammalian Cell Lines on Collagen Microcarriers**

917C0484B Moscow BIOTEKHNOLOGIYA in Russian  
No 6, Nov-Dec 90 (manuscript received 14 Apr 88)  
pp 35-37

[Article by O. P. Buadze, A. F. Vasilchenko, M. A. Zavalnyy, Z. I. Pukhova, and B. B. Yegorov, Biomedical Technology Scientific Research Institute, Moscow]

UDC 57.085.23.083.3

[Abstract] This paper presents the results of cultivation of several intertwining cell lines on collagen microcarriers. The investigation involved the use of human kidney intertwining cell line (producer of urokinase plasminogen activator, RH-PA), and intertwining cell lines of Chinese hamster ovary (CHO), grass monkey kidney cells (COS-1), and rat fibroblast-like cells (Rat-2) bound to collagen microcarriers and Cytodex-3 microcarriers.

The results demonstrated that the CHO, Rat-2, and COS-1 cell lines bound effectively with the collagen microcarriers. However, in the case of RH-PA, it was found that optimization of the inoculation conditions was much more important when using collagen microcarriers, as compared to Cytodex-3 microcarriers. Inoculation in this instance was only effective when conducted with a reduced volume of nutritive culture and without agitation for the first four hours of cultivation. Under these conditions of pseudosuspended cultivation on collagen microcarriers, the RH-PA cell lines were able to effectively produce plasminogen activator. Accordingly, these results demonstrate that collagen microcarriers can be employed for the pseudosuspended cultivation of various intertwining cell lines in order to produce cellular mass and biologically active substances of a cellular nature. Figures 3; tables 1; references 7: 4 Russian, 3 Western.

**Comparative Investigation of Effect of Placental Tissue Extract and Fibronectin on Mammalian Cells in Vitro**

917C0484C Moscow BIOTEKHNOLOGIYA in Russian  
No 6, Nov-Dec 90 (manuscript received 2 Dec 88)  
pp 38-40

[Article by A. A. Narimanov and B. K. Gavriluk, Biological Physics Institute, USSR Academy of Sciences, Pushchino, Moscow Oblast]

UDC 57.086.83

[Abstract] The effects of fibronectin and placental tissue extract growth factors on replating mammalian cultures was investigated. A saline (1 M NaCl) human placental tissue extract containing 0.6 mg/ml fibronectin was used in final concentrations of placental tissue extract ranging from 0.5 to 20 percent and tested on Syrian hamster VNK-21 cells in a culture of murine myeloma line X63-Ag 8.653. The results demonstrated that the final cell population density was approximately the same for both the extracted and the purified plasma fibronectin, but the activity of placental tissue extract and plasma fibronectin with respect to the different types of cells varied substantially. It was shown that the protein activity rose dramatically with the VNK-21 fibroblasts, with this effect dependent on the glycoprotein concentration and serum concentration in the culture medium. Fibronectin's growth stimulating effect is revealed in a culture with a low serum concentration, while cell aggregates in a stationary growth phase form when these same protein quantities are added to VNK-21 cells grown on a complete nutritive culture. It was shown also that increasing the fibronectin concentration to 60-120  $\mu$ g/ml abruptly diminishes the VNK-21 cell number. This phenomenon is not due to a toxic effect of large concentrations of fibronectin; the excess fibronectin merely suppresses cell growth. Accordingly, the results indicate that placental tissue extract and plasma fibronectin have a similar biological effect. Thus, placental tissue extract

may be used in place of plasma fibronectin in animal cell cultures and monolayer fibroblast-like cell cultures. Figures 2; references 16: 1 Russian, 15 Western.

**Results of and Potentials for Using Spatial-Globular Polymers in Biotechnology**

917C0484D Moscow BIOTEKHNOLOGIYA in Russian  
No 6, Nov-Dec 90 (manuscript received 14 Jun 89)  
pp 47-49

[Article by V. M. Kolikov, A. B. Oreshkov, N. V. Katushkina, P. S. Grigoryev, G. K. Imangaziyeva, and N. Ya. Lyubman, Leningrad Polytechnical Institute imeni M. I. Kalinin; "Kazmekhanobr" Scientific Research Institute]

UDC 543.544:576.858.75

[Abstract] The potential for using globular structure polymer manufactures in conjunction with macromolecular sorbates (proteins and supramolecular structures) as a means of filtering bacteria and viruses from water was studied. The results demonstrated that the adsorbent capacity for protein depends substantially on the permeability of the material, with filters with a capacity of 1,000 specific volume/hour shown to be the best for removing *Escherichia coli* K-12,  $\lambda$  phage, and flu strain X-79 (H3N2) from the water. The polymer filtering elements, tablets, and hollow cylinders made of melaminoformaldehyde resin are easily sterilized with alcohol or formalin and by heating. The data proved that the productivity and effectiveness of this filtration process are two to three orders of magnitude greater than the anion exchangers that are ordinarily used for these purposes. Accordingly, the findings suggest that the use of polymer filtering elements with macromolecular sorbates to filter water is very promising. Figures 4; tables 1; references 7: 5 Russian, 2 Western.

**Filtrational, Selective, and Operational Description of Aromatic Polyamide Ultrafiltration Hollow Fibers**

917C0484E Moscow BIOTEKHNOLOGIYA in Russian  
No 6, Nov-Dec 90 (manuscript received 16 May 88)  
pp 50-51

[Article by A. Ye. Polotskiy, A. P. Borshchev, S. V. Tsareva, O. N. Afanasyeva, V. Ye. Mikhaylov, Ye. Ye. Fedotova, I. L. Potokin, N. A. Zhdanova, A. N. Cherkasov, and L. P. Perepechkin, All-Union Scientific Research Institute of Very Pure Biopreparations, Leningrad]

UDC 66.067.3

[Abstract] The filtrational and selective properties of ultrafiltration fibers made of VPU aromatic polyamide were investigated, and the best fields for their application were determined. The investigation centered on VPU-5A, VPU-15PA, and VPU-100PA fibers produced

from polyphenylenephthalimide in dimethylacetamide by means of wet formation. The results demonstrated that these fibers can be used to: 1. concentrate macromolecular compounds and biologically active substances; 2. purify substances of low molecular weight organic and inorganic impurities; 3. purify water of polymer impurities; and 4. concentrate highly dispersed particles (viruses, bacteria, and cells). In conclusion, the VPU-5A and VPU-15PA hollow fibers effectively isolate "small molecules" including toxins, keylons [sic], cell wall lysates, and disaccharides. Figures 3; tables 1; references 4: Russian.

**Design of Devices for Mixing Suspended Cell Cultures With Enhanced Mechanical Sensitivity**

917C0484F Moscow BIOTEKHNOLOGIYA in Russian  
No 6, Nov-Dec 90 (manuscript received 31 Mar 88)  
pp 52-54

[Article by G. P. Pterskikh, A. G. Raputo, and V. S. Faustov, All-Union Scientific Research Engineering Institute of Applied Biochemistry, Moscow]

UDC 663.18

[Abstract] This paper presents the description of a mixing apparatus intended for the suspended culturing of animal and plant cells that provides an adequate level of gas mass exchange without inhibiting cell viability during agitation. The researchers first determined the zone where the greatest shift deformations occurred and how best to diminish them, while concomitantly supporting the necessary level of mass exchange and agitation. It was found that in order to improve the mixing devices, it was necessary that the gas mass exchange intensity be elevated without increasing the mechanical effect on the cells during agitation. There are two types of mixing devices which differ in their effect on the cells. The turbine mixers have straight blades with high faces and low friction resistance. It was shown that the best mixer would be one that had wide tilted blades or a screw mixer, the engineering of which would provide sufficient mixing intensity and simultaneously diminish the shear forces on the blade surface when correctly profiled. These conclusions were used to improve the mixers for mammalian cell cultures. The novel mixers increased the gas mass exchange by 1.5- to 2-fold, thus indicating that they make it possible for nutritive cultures of high growth properties to be more productively used. Figures 1; tables 1; references 14: 10 Russian, 4 Western.

**Investigating Toxicity and Remote Sequelae of Lysine Produced by Microbial Synthesis on Experimental Animals**

917C0484G Moscow BIOTEKHNOLOGIYA in Russian  
No 6, Nov-Dec 90 (manuscript received 1 Jul 88)  
pp 65-69

[Article by O. N. Golinko, O. D. Olyshevskaya, L. P. Kryshevich, Ye. A. Feduk, N. M. Zaverukha, and A. F.

Opolskiy, Kiev Scientific Research Institute of Nutrition, Ukrainian SSR Ministry of Health; Kiev State University imeni T. G. Shevchenko]

UDC 663.18[577.112.385.4

[Abstract] This article presents the results of the biomedical investigation of lysine monochloride produced by microbial synthesis as part of a continuing series of studies. Lysine monochloride, a white crystalline substance with a yellowish tinge, was administered intragastrically to albino rats, albino mice, and guinea pigs in doses ranging from 3.0 to 25.0 g/kg, once or several times. Animals that received very high doses (25 g/kg) exhibited a 100 percent mortality rate, with those receiving 5.0 g/kg or less showing no evidence of any changes. The lethality of high doses of lysine monochloride is not due to the lysine monochloride itself, but rather the fact that large amounts of chlorine upset the electrolyte and water balances in the body. The LD<sub>50</sub> of lysine monochloride ranges from 9.16 g/kg for guinea pigs to 17.38 g/kg for mice, indicating that toxicity was a function of the degree of oxidative metabolism. Since the LD<sub>50</sub> figures for all three animal species are above 5.0 g/kg, lysine monochloride can therefore be classified as relatively non-toxic. Results of additional studies focusing on the number of chromosome aberrations in human peripheral blood leukocyte cultures, rat bone marrow cultures, and the number of lethal mutations in *Drosophila* demonstrated that lysine monochloride is not gonadotoxic, embryotoxic, teratogenic, or mutagenic. Tables 6; references 25: 20 Russian, 5 Western.

#### Investigation of Biological Effect of Denucleinated Product Obtained From Paprin

917C0484H Moscow BIOTEKHNOLOGIYA in Russian  
No 6, Nov-Dec 90 (manuscript received 27 Jul 88)  
pp 70-72

[Article by M. L. Ioffe, G. N. Maksimova, N. V. Tsygankova, and V. N. Zhuchkov, All-Union Scientific Research Institute of Proteinaceous Substance Biosynthesis]

UDC 663.18[577.112.3

[Abstract] Experimental trials were performed on 50 male albino rats to investigate the biological value and possible toxic effect of denucleinated protein product with a diminished lipid content obtained from *Candida maltosa* VSB-779. The rats in the first series of experiments were maintained on a diet with a 10 percent protein content for 10 days. The results demonstrated that the experimental group, which received the denucleinisate as its protein, grew 1.3-fold more, with 1.4-fold greater pure protein utilization. These findings suggest that the denucleinisate is more anabolically effective than the original biomass. In the second series of experiments in which the animals were maintained on a 36 percent protein content in the diet for 90 days, it was

shown that the denucleinisate is completely non-toxic. This method for producing protein with a diminished nucleic acid content is easier, more effective, and less expensive than the technological processes that involve protein extraction or hydrolysis and the subsequent isolation of protein products from mixtures of dissolved substances. In conclusion, this product may be regarded as a source of dietary protein; however, further biomedical investigation is needed to identify any remote sequelae. Figures 1; tables 4; references 17: 11 Russian, 6 Western.

#### Investigation of Activity of Enzymes Involved in Xenobiotic Metabolism to Assess Quality of Proteinaceous Products of Microbial Synthesis

917C0484I Moscow BIOTEKHNOLOGIYA in Russian  
No 6, Nov-Dec 90 (manuscript received 16 Nov 88)  
pp 73-76

[Article by V. G. Vysotskiy, A. N. Martinchik, G. I. Bondarev, Ye. M. Mamayeva, A. I. Feoktistova, N. N. Chernov, Ye. V. Peskova, and V. M. Zhminchenko, Nutrition Institute, USSR Academy of Medical Sciences, Moscow]

UDC 577.152

[Abstract] The activity of enzymes involved in the biotransformation of foreign substances in the liver was investigated during subacute experiments on male Wistar rats to assess the quality and toxicity of mycelium biomass from *Coriolus pubescens* VSB-923 and the yeast production of isolates of paprin [sic] protein and eprin [sic] biomass. The animals were maintained for three months on an 18 percent protein diet with either the proteins in question (experimental group) or casein (control group). The results demonstrated that fungal mycelium biomass consumption is accompanied by a noticeable increase in monooxygenase activity and cytochrome P-450 content in the rat hepatic microsomes. In addition, investigation of the quality of yeast products from eprin and paprin showed that the isolate of the yeast protein paprin is no different than casein in its effect on xenobiotic metabolic processes. In contrast, eprin yeast biomass distinctly activates benz(a)pyrene hydroxylase in the hepatic microsomes and increases the cytochrome B<sub>5</sub> concentrations. There is also a slight increase in the cytochrome P-450 concentration. Moreover, investigation with some of the enzymological indicators traditionally employed in assessing toxicity did not indicate any substantial changes in the enzymatic activity of eprin or paprin in the blood sera. Furthermore, none of the protein products in question had amounts of toxic impurities sufficient to cause hyperenzymemia or a decrease in cytochrome P-450 concentrations, which would otherwise suggest a hepatotoxic effect on the chemical agents due to the formation of toxic metabolites. However, eprin did increase hepatic  $\gamma$ -glutamyl transferase activity, which can be a sign of the germination of tumor cells, and consequently,

further study is needed to determine whether eprin is carcinogenic or cocarcinogenic. In conclusion, the results demonstrated that the effect of the protein products on the processes of xenobiotic biotransformation may be due to dietary value (nutrient and protein content) as well as the presence of non-alimentary biologically active substances (contaminants and modified integral components). Tables 5; references 13: 3 Russian, 10 Western.

**Systematic Approach to Statistical Analysis and Optimization of Biotechnology Production of Vaccines**

917C0484J Moscow BIOTEKHNOLOGIYA in Russian  
No 6, Nov-Dec 90 (manuscript received 15 Jun 89)  
pp 77-82

[Article by A. N. Lisenkov, M. P. Chumakov, and L. L. Mironova, Computing Center, USSR Academy of Sciences, Moscow; Poliomyelitis and Viral Encephalitis Institute, USSR Academy of Medical Sciences, Moscow]

UDC 519.24.62-50

[Abstract] This paper discusses the complexity of producing antiviral vaccines and preparations and reviews

the biotechnological processes involved. A systematic approach to the statistical study and optimization of all the facets of producing and testing vaccine preparations was developed. The steps involved in the implementation of this approach include: the development of technology, indicating parameters and relationships; analysis of the variability of basic indicators at control points; quantitative assessment of the relationships of technical parameters to one another; and construction of a model to optimize and monitor these technological processes. Presenting the multifaceted biotechnological production of vaccines using the "black box" model offers a clear picture of the basic relationships of the process and is convenient for analyzing the sources of variability in product quality. In addition, the indicators by which the economic effectiveness of technology may be evaluated were selected based on analysis of the experimental series of vaccines. In the future, the authors hope to develop a system for the automated processing of data from technological protocols with the goal of uninterrupted statistical monitoring and production control. It was also noted that this systematic approach to statistical analysis and optimization of multioperational biotechnology of vaccines has much in common with the current Japanese concept of quality control. Figures 1; references 20: 17 Russian, 3 Western.

**Use of Phage-Plasmid Vector for Expression of Corynebacterium Glutamicum Threonine Genes in Escherichia Coli Minicells**

917C0482A Moscow MOLEKULARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA in Russian No 1, Jan 91 (manuscript received 7 Dec 90) pp 19-21

[Article by A. L. Okorokov, N. O. Bukanov, O. Yu. Beskrovnaya and N. K. Yankovskiy, All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow]

UDC 579.842.24:579.252.55].08

[Abstract] A phage-plasmid (phasmid) vector was constructed for expression of threonine genes of *Corynebacterium glutamicum* in *E. coli* X925 minicells. The phasmid  $\lambda$ pSL5, a hybrid of plasmid pUC19 and phage  $\lambda$ 47.1, used for transformation of the *E. coli*, bore a 7.0 kb fragment of *C. glutamicum* DNA encoding threonine genes. The transformed minicells produced three major products of the threonine systems identified as 43,000, 38,500 and 35,000 D proteins. These observations demonstrated the feasibility of using phasmids for expression of foreign genes in *E. coli* minicells, and offer the important advantage that such cells may be stored for years at -70°C under glycerol. Figures 2; references 11: 4 Russian, 7 Western.

**Specific Proteolysis of Yersinia Pestis Outer Membrane Proteins by Fibrinolysin Coagulase Encoded by  $Ca^{2+}$ -Dependence Plasmid of Y. Pseudotuberculosis**

917C0482B Moscow MOLEKULARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA in Russian No 1, Jan 91 (manuscript received 19 Jan 90) pp 21-24

[Article by V. A. Shmelev, P. A. Cherepanov, L. Yu. Nosova, G. A. Karimova, S. G. Popova and A. N. Noskov, All-Union Scientific Research Institute of Applied Microbiology, USSR Ministry of Medical Industry, Obolensk, Moscow Oblast]

UDC 579.842.23:[579.232:547.96]:579.252.5

[Abstract] An analysis was conducted on the effects of 9.5 kb pesticin plasmid pP3 isolated from *Yersinia pestis* EV76 on the synthesis and degradation outer membrane proteins of *Y. pseudotuberculosis* 6953. The results demonstrated that pP3 encodes factors leading to proteolysis of *Y. pseudotuberculosis* membrane proteins, as it does in *Y. pestis*. Specifically, the 150 kD protein was cleaved to 138 kD, the 48.5 kD protein was cleaved to 45 kD, and 51 and 38 kD secretory proteins were completely hydrolyzed during transit across the cytoplasmic membrane. In the case of the 150 and 48.5 kD proteins the lost fragments were not crucial to translocation.

Additional in vitro studies demonstrated that the fibrinolysin coagulase produced by virulent bacteria has proteolytic activity and hydrolyzes the outer membrane proteins. Figures 3; references 23: 6 Russian, 17 Western.

**Enhanced Expression of lysD Gene of Plasmid CoID and Protein Distribution in Escherichia Coli**

917C0482C Moscow MOLEKULARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA in Russian No 1, Jan 91 (manuscript received 27 Mar 90) pp 24-28

[Article by D. G. Negorev, R. L. Gorovits, S. V. Mashko and M. N. Kolot, All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, USSR Ministry of Medical Industry; Institute of Molecular Genetics, USSR Academy of Sciences, Moscow]

UDC 579.842.11:579.252.55:615.33]:[579.222:547.96

[Abstract] An analysis was conducted on protein distribution in *E. coli* TG-1 cells transformed with recombinant plasmid pKD101 bearing the *lysD* gene of plasmid CoID. Polyacrylamide gel + SDS electrophoresis of the protein products showed that expression of *lysD* in *E. coli* resulted in marked changes in protein distribution. Specifically, the altered patterns indicated increased permeability of the cytoplasmic and periplasmic membranes. Consequently, the *lysD* gene may be useful in enhancing yields of genetically engineered protein in bacterial systems, as well as in ensuring rapid secretion of proteins potentially lethal to the host cell. Figures 5; references 16: 3 Russian, 13 Western.

**Study of Possibility of Suppression of Expression of E. coli rplJ Gene by Antisense RNA**

917C0571 Kiev TSITOLOGIYA I GENETIKA in Russian Vol 24 No 6, Nov-Dec 90 pp 25-31

[Article by Ye. B. Paton, A. N. Zhivolup and I. V. Krupskaya; Institute of Molecular Biology and Genetics; UkSSR Academy of Sciences; Kiev]

UDC 577.21

[Abstract] The possibility of stabilizing recombinant DNAs containing genes which are toxic to host cells at a high level of expression with the aid of antisense mRNAs has been demonstrated. This stimulated an interest in the possibility of the effect of antisense RNA on *rplJ* gene expression and involved construction of recombinant plasmids containing the antisense sequence of the *E. coli rplJ* gene under control of lac promoter. The experiment demonstrated the possibility of inhibition of *rplJ* gene by its antisense RNA. Achievement of a noticeable effect required a 100-fold molar excess of antisense-RNA over sense-RNA. Synthesis of such RNA did not reduce the level of *rplJ* gene expression in the intact *rplJ* operon of *E. coli* and thus ensured excess synthesis of protein L7/L12, coded by the distal cystron of the mRNA. References 20: 8 Russian, 12 Western.

**Bacterial Infection of Large Intestine Sutures  
With Use of Novel Antibacterial Suture Materials**

917C0398A Tbilisi SOOBShCHENIYA AKADEMII  
NAUK GRUZINSKOY SSR in Russian Vol 140 No 1,  
Jan 91 (manuscript received 9 Aug 90) pp 169-172

[Article by T. F. Chkhikvadze, D. N. Kokhodze, and D. T. Dzhikeya, Tbilisi State Medical Institute]

UDC 615.468.6

[Abstract] The role of various types of antibiotic suture materials (resolving—oktselon [sic] with No. 2 thread, and non-resolving—capron thread) in the pathogenesis of bacterial infection following surgery in the large intestine was investigated on 48 rabbits of average age and weight. The caecum was removed, and a 5 cm section was resected, forming an "end-to-end" type of unilinear suture. Results of monitoring the biological and physical seal of the anastomosis demonstrated that healing of the latter depends on the bacterial infection of the intestinal suture. It was also shown that use of the resolving antibiotic thread in a large intestine anastomosis is best for normalization of collagen synthesis, which improves the physical and biological seal of the anastomosis. This novel resolving suture material is recommended for widespread clinical use in large intestine surgery. Figures 1; tables 1; references 2: Western.

**Effect of Plaferon on Functional Status of Liver  
During Experimental Formation and Regression of  
Hydronephrosis**

917C0398B Tbilisi SOOBShCHENIYA AKADEMII  
NAUK GRUZINSKOY SSR in Russian Vol 140 No 1,  
Jan 91 (manuscript received 2 Aug 90) pp 165-168

[Article by V. V. Bablukhadia and N. A. Papava, Urology and Nephrology Scientific Research Institute imeni A. P. Tsulukidze, Georgian SSR Ministry of Health]

UDC 616.63-007.63:616.36-091:615.7

[Abstract] The effect of plaferon, a novel interferon preparation approved for clinical use, was investigated on the functional status of the kidneys and liver in recanalization of the ureters following experimental hydronephrosis. The experiments were performed on 36 female dogs with hydronephrosis of both kidneys or with hydronephrosis of the only remaining kidney. The experimental hydronephrosis lasted from one week to three months. Following removal of the ligatures, the animals were treated with conventional preparations (legalon, khofitol [sic], LIV-52) as well as a ten-day course of 0.2 mg of plaferon administered intravenously. The results demonstrated that in dogs with one week of bilateral hydronephrosis, the blood concentrations of creatinine, urea, and residual nitrogen returned to normal within 10 days of removing the ligature, as opposed to 1.5 months for control subjects. In addition, restoration of kidney

and liver function took longer in animals with hydronephrosis of the only remaining kidney than in bilateral hydronephrosis. Thus, it was shown that plaferon acts on the compensation and restoration processes in the kidneys to normalize the nitrogen metabolite content in the blood. References 3: Russian.

**Plaferon Treatment of Experimental  
Ophthalmoherpes**

917C0398D Tbilisi SOOBShCHENIYA AKADEMII  
NAUK GRUZINSKOY SSR in Russian Vol 140 No 1,  
Jan 91 (manuscript received 2 Aug 90) pp 137-139

[Article by M. V. Zhgenti, V. I. Bakhutashvili, Yu. F. Maychuk, and A. I. Shchipanova, Experimental Morphology Institute imeni A. N. Natishvili, Georgian SSR Academy of Sciences]

UDC [578.825.11:617.713-002]616-08

[Abstract] The efficacy of plaferon ointment in the treatment of experimental ophthalmoherpes keratitis (Koptev strain, herpes type I) was investigated in pubertal chinchilla rabbits (2.0-3.5 kg). Preliminary research demonstrated that plaferon, which is obtained from the human placenta, was non-irritating and non-toxic to the eye tissue and that it aided the healing of experimental ophthalmoherpes. The results demonstrated that the animals that received the plaferon ointment at the height of the disease had a lower rate of ulcerated eyes than the control group and the group treated with leukocytic interferon. The experimental group also exhibited a 0 percent rate of affected eyes at the end of the experiment as opposed to 37.5 percent and 12.5 percent for the other two groups, respectively. References 9: 5 Russian, 4 Western.

**Results From the Use of Hemosorption in an  
Emergency Hospital**

917C0443 Frunze ZDRAVOOKHRANENIYE  
KIRGIZII in Russian No 1, Jan-Feb 91 pp 60-61

[Article by B. S. Dzhuzenova, M. Yu. Nurgaziyeva, and K. A. Tlkarskiy, Department of Internal Medicine, Faculty of Postgraduate Medicine, Kirghiz State Medical Institute, Emergency Hospital]

[Abstract] Hemosorption—the elimination of pathological substances in detoxification of the body—has been shown to be effective in resuscitation involving poisonings and toxic states caused by surgical pathology. Over the last four years, the hospital at the Kirghiz State Medical Institute has used hemosorption not only for poisonings, but also for severe hormone-dependent bronchial asthma, for acute surgical pathology with intoxication. The work reported here involves hemosorption used in 62 individuals with various pathologies. In all but one asthma patient, one or two sessions of hemosorption removed the asthma symptoms and enabled a dramatic reduction in hormone

dose. The procedure completely removed hives, dermatitis, and angioneurotic edema in the food allergy patients. Some 67 percent of individuals who had been brought in for poisoning were brought out of comas. A few patients did report side effects—pyrogenic reaction, collapse, and sorbent thrombosis.

#### **Effect of Xymedone on the Healing of Linear Wounds**

917C0455A Kiev *KLINICHESKAYA KHIRURGIYA*  
in Russian No 1, Jan 91 pp 10-12

[Article by S. G. Izmaylov and O. S. Kochnev, Department of Emergency Surgery, Kazan State Institute of Postgraduate Medicine imeni V. I. Lenin, USSR Ministry of Health; Central Scientific Research Laboratory, Kazan Medical Institute imeni S. V. Kurashova]

UDC 616.5-001-08-07

[Abstract] The effect of a new preparation of the pyrimidine series, xymedone, on the healing of experimental linear wounds was studied in order to expand the indications for its use in surgery. A total of 173 outbred male rats were lacerated on the back with two parallel, linear wounds 50 mm long. Xymedone was administered to 143 and methyluracil to 10, and 43 served as controls. Xymedone was found to promote a substantially more durable fusion of the wound edges, with its stimulating effect peaking during the first five to seven days. The preparation was then tested in the clinic on 240 individuals (aged 15-54) who had undergone surgery for uncomplicated acute appendicitis. Upon administration of xymedone (0.5 g, four times daily), the individuals in the experimental group exhibited normalized body temperature sooner than did those in the control group. Local inflammation in the wound area disappeared earlier, and wound edges fused more durably. As a result, sutures were removed from the individuals in the experimental groups one to two days sooner than in those of control. Incidence of complications dropped from 13.8 percent to 3.9 percent. References 3: Russian.

#### **Use of Immobilized Elastoterase for Treatment of Acute Purulent Diseases of Soft Tissue**

917C0455B Kiev *KLINICHESKAYA KHIRURGIYA*  
in Russian No 1, Jan 91 pp 19-21

[Article by A. A. Lobenko, A. A. Burov, M. T. Ploshchenko, T. I. Davidenko, A. V. Chuyenko, V. I. Kondratyuk, V. V. Kirsenko, and V. N. Kovalenko, Department of Naval Medicine, Odessa Medical Institute imeni N. I. Pirogov; Physical Chemical Institute imeni A. V. Bogatskiy, UkSSR Academy of Sciences; District Military Hospital, Odessa]

UDC 616-018-002.3-08

[Abstract] Unlike chymotrypsin, chymopsin, trypsin, and terrilitin, the proteolytic enzyme elastoterase has a

high substrate specificity and is active in relation to casein, elastin, fibrin, and collagen. The researchers here studied the efficacy of the preparation in the treatment of acute pyonecrotic diseases of the soft tissue. A total of 49 individuals were treated with immobilized elastoterase on wound dressings. After necrotized tissue was removed, the wounds were flushed with hydrogen peroxide and antiseptics. A pad with the elastoterase was then coated with furacylin and wrapped. The dressing was changed daily for the first two days, and then every other day. The researchers report that the wounds were clean by day three or four, with the patients' condition considerably improved. By day two or three, inflammation and hyperemia around the wound was reduced, pain was gone, and the patients had normal sleep patterns, appetite, and body temperature. On day three, granulation appeared; on day four, wound edges began to close. On day five, epithelialization began. References 2: Russian.

#### **Alteration of the Tonus of the Autonomic Nervous System in Combined Epidural Anesthesia With Azacain**

917C0455 Kiev *KLINICHESKAYA KHIRURGIYA*  
in Russian No 1, Jan 91 pp

[Article by F. S. Vashchuk, A. I. Treshchinskiy, P. S. Maksimenko, S. P. Dedovets, and N. M. Nekrasova, Department of Anesthesiology and Resuscitation, Kiev State Institute of Postgraduate Medicine, USSR Ministry of Health]

UDC 616.8-009.614-06

[Abstract] A new domestically produced local anesthetic, azacain (2,4,6-trimethylanilide 1-butylpiperidincarboxylic acid hydrochloride), was used for epidural anesthesia. The preparation is colorless and transparent and is supplied in ampules of 2 and 5 ml. Its effect lasts five to seven hours, and the optimum dose is 2-5 mg/kg body weight, or 20-50 ml 0.75 percent solution. After a catheter is fixed in the epidural space, a test dose is given (1 ml 0.75 percent solution). Then the remaining dose of preparation is administered at a rate of 0.1 ml/min. Slow infusion of the preparation prevents undesirable effects associated with a rapid rise in pressure in the epidural space. References 1: Russian.

#### **Expression of Human Interleukin-2 Gene in *E. coli***

917C0456A Moscow *DOKLADY AKADEMII NAUK SSSR* in Russian Vol 315 No 4, Dec 90 pp 994-996

[Article by A. Ya. Avot, Yu. P. Bundulis, V. Ya. Ose, N. V. Romanchikova, V. A. Skrivelis, E. K. Yankevits, A. Yu. Tsimanis, and USSR Academy of Sciences Corresponding Member E. Ya. Gren, Institute of Microbiology, LaSSR Academy of Sciences, Riga]

UDC 547.963.3

[Abstract] Data are presented on the engineering of plasmids for the expression in *E. coli* of human interleukin-2, a key lymphokine that is involved in T-cell differentiation and proliferation. The strategy for engineering the expression plasmids consisted in using the plasmid pAA1213-23 as the initial plasmid. The gene for mature IL-2 is controlled by a strong, regulated promoter of the tryptophan operon of *E. coli*, with a polylinker segment containing cleavage sites for EcoRI, BamHI, and SmaI restrictases just before the initiating ATG codon. Cleavage at the EcoRI site or the BamHI site, in combination with subsequent filling by DNA polymerase I or treatment with an S1 nuclease, enabled the production of a series of recombinant plasmids that had ribosome recognition segments of varying length and structure and expressed bacterial IL-2 with an efficiency that ranged from 0.01 percent to 20 percent of the total cell protein. Recombinant IL-2 content in the *E. coli* was determined with EIA in a system of polyclonal and monoclonal antibodies, biological titration, and scanning of the optical density of polyacrylamide gels after electrophoresis of cell lysates and silvering of gels. The IL-2 gene was expressed only after induction of the tryptophan promoter by 3-indolylacrylic acid. The data obtained by the researchers indicate that the primary effect on the level of IL-2 expression is exerted by the structure of the ribosome binding segment. Electrophoresis demonstrated that the induction of the tryptophan promoter resulted in the synthesis of proteins with a molecular weight of 15,000 daltons, and the proteins react specifically with polyclonal or monoclonal antibodies to IL-2 in immunoblotting. Tests indicated that two proteins that have an identical molecular weight (15,000 daltons) and that react with antibodies but have different pI values were formed in the bacterial cell in a ratio of 9:1. The major protein, with a pI of 6.8, had an N-terminal residue of methionine. The expression of the IL-2 gene had no effect on growth of the bacterial cells, although the rate of growth of the culture was tied to the level of IL-2 synthesis, and the specific rate of growth of the culture declined as the level of recombinant protein synthesis grew. Figures 1; references 14: 1 Russian, 13 Western.

**Immobilization of Enzyme-Membrane Complexes—A New Approach to Creating Highly Efficient Biocatalysts**

917C0456B Moscow DOKLADY AKADEMII NAUK  
SSSR in Russian Vol 315 No 4, Dec 90 pp 1000-1003

[Article by P. S. Nys, A. V. Sklyarenko, D. I. Igans, P. L. Zaslavskaya, Yu. E. Bartoshevich, USSR Academy of

Medical Sciences Member S. M. Navashin, All-Union Scientific Research Institute of Antibiotics, Moscow]

UDC 577.155.3:615.33

[Abstract] Immobilized cells have found increasingly broader applications in recent years as biocatalysts for processes involving the transformation of organic compounds. The most productive way of producing highly active, stable biocatalysts is to slightly modify cells to increase the permeability of the cell wall while maintaining the integrity of the cell fragments responsible for localizing a target enzyme. The work reported here proposes a new approach to immobilizing microbial cells. The approach is based on the complexing of cell structures and a target enzyme in a way that enables the cell to bind additional quantities of enzyme and thereby produce biocatalysts that are considerably more active stable than native cells. The approach is examined in detail in the context of the production of a biocatalyst for the transformation of betalactam antibiotics, with the use of *E. coli* cells that contain penicillinamidase. Serving as the basis for the creation of the biocatalyst was a study of a model system of an aqueous enzyme-cell solution in which the enzyme itself removes the diffusion boundaries, thereby increasing the permeability of the cell membranes. Ultimately, the interaction of the cells with the penetrating enzyme results in a strong enzyme-membrane complex and makes it possible to achieve a high degree of enrichment of the cells with the target enzyme via two mechanisms: removal of substances that, from the standpoint of the target enzyme's activity, are ballast; and binding of additional quantities of enzyme by the cell. The enzyme of the immobilized enzyme-membrane complex is twice as strong as an enzyme in immobilized cells and five times as strong as an enzyme immobilized after extraction from the cell. Figures 1; references 10: 5 Russian, 5 Western.

**Human Thermal Neutrality Zone in Thermal Adaptation**

917C0456C Moscow DOKLADY AKADEMII NAUK  
SSSR in Russian Vol 315 No 4, Dec 90 pp 1011-1014

[Article by M. D. Khudayberdiyev and TuSSR Academy of Sciences Academician F. F. Sultanov, Institute of Arid Region Physiology and Experimental Pathology, TuSSR Academy of Sciences, Ashkhabad]

UDC 612.591+531

[Abstract] Thermal adaptation studies involving 16 men aged 21-27 were conducted in the summer and winter seasons. The men were seated in a chamber whose temperature was automatically regulated. The hand of



the right arm was extended through a special hole in the chamber wall into a compartment in which the air temperature was maintained at  $25^{\circ} + 1^{\circ}\text{C}$ . At the beginning of the test, the air temperature in the chamber was kept at  $28^{\circ}\text{C}$  for 50-60 minutes. Then it was lowered in stages, in  $3^{\circ}\text{C}$  increments, to  $22^{\circ}$  in the summer and to  $19^{\circ}$  in the winter and was later raised, in the same increments, to  $40^{\circ}\text{C}$ . At each stage, the temperature was kept constant for 18-20 minutes. When it reached the low point, it remained there for 40-45 minutes. The researchers measured the temperature of the skin of the forehead, chest, hand, thigh, and calf and of the air to within  $0.1^{\circ}\text{C}$ ; rectal temperature was measured to within  $0.01^{\circ}\text{C}$ . At the various stages of ambient temperature, skin temperatures were generally higher in summer than in winter, rectal temperatures, generally lower, which was interpreted as a physiological indication of thermal adaptation. The upper and lower temperature limits for thermal neutrality were determined to be  $19^{\circ}$  and  $33^{\circ}$  in winter and  $23^{\circ}$  and  $31^{\circ}$  in summer. The differences in the two intervals are thought to be the result of variations in the levels of norepinephrine and serotonin in temperature-regulating centers and variations in sensitivity to those amines in the neurons that are involved in heat regulation. Figures 1; references 15: 6 Russian, 9 Western.

**Indices of Blood Coagulation System in Dogs After Compensation of Blood Loss With Protosalin, Novel Plasma Substitute Solution**

917C0457B Kiev *FIZIOLOGICHESKIY ZHURNAL in Russian* Vol 37 No 1, Jan-Feb 91 (manuscript received 28 Mar 90) pp 42-44

[Article by M. S. Voloshina and R. B. Gutnik, Hematology and Blood Transfusion Institute, Ukrainian SSR Ministry of Health, Kiev]

UDC 612.1.115

[Abstract] Coagulation dynamics following acute massive blood loss were investigated in mongrel dogs (10-15 kg) suffering a 50-60 percent total blood loss. The animals were then given a transfusion of the novel plasma substitute protosalin [sic] 15-25 min later. Measurements of general indicators of blood coagulation revealed that the animals were experiencing coagulopathy typical of the II-III stages of thrombohemorrhagic syndrome. The results also showed that there was enhanced fibrinolytic activity of whole blood. While the coagulogram indicators did not return to normal until one week following the blood loss and subsequent transfusion, protosalin transfusion to animals following acute massive blood loss does not exacerbate post-hemorrhagic coagulopathy. These results suggest that protosalin may be used in hemorrhagic shock in place of whole blood. Tables 1; references 10: Russian.

**Quantitative Determination of DNase Activity of Staphylococcus Aureus Isolated From Monkeys**

917C0473A Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 12, Dec 90 (manuscript received 25 Jul 89; in final form 5 Mar 90) pp 10-12

[Article by V. V. Kakubava, A. A. Trots, E. K. Dzhikidze and Z. K. Stasilevich, Scientific Research Institute of Experimental Pathology and Therapy, USSR Academy of Medical Sciences, Sukhumi]

UDC 579.861.2:579.22].083.12

[Abstract] A novel plate technique was developed for DNase activity of human and monkey Staphylococcus aureus isolates. The essential features consisted of using 0.25 mg/ml DNA in 1.3 percent agar with 12 mM CaCl<sub>2</sub>, 12 mM MgCl<sub>2</sub> and 1 µg/ml ethidium bromide. The wells were filled with culture supernatant and the Petri dishes incubated for 48 h at 37°C and for 4 h at 4°C. Subsequently the dishes were examined under UV light, photographed using an orange filter, and the zones of clearing cut out and weighed. Standard weight versus DNase activity plots led to determination of DNase levels in unknown wells. The method has a sensitivity of 25 ng/ml (0.004 IU/ml), with the different strains exhibiting DNase activities ranging from 25-35 to 5200 ng/ml. There were no differences between human and monkey isolates in terms of DNase activity. Figures 2; references 7: Russian.

**Lytic Activity of Phage P of Yersinia Pestis Serovar 3**

917C0473B Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 12, Dec 90 (manuscript received 21 Dec 89) pp 15-18

[Article by N. N. Novoseltsev, V. I. Marchenkov, A. N. Kravchenko, V. Ye. Valentsev and L. A. Tinker, Rostov-on-Don Scientific Research Anti plague Institute]

UDC 578.262:579.842.23

[Abstract] A novel phage isolate from Yersinia pestis serovar 3—phage P3—has been tested against 1800 bacterial strains to determine its spectrum of lytic action. The bacteria tested were isolated in 1925-1987 and were represented by 760 Y. pestis strains, 262 Y. pseudotuberculosis strains, 252 Y. enterocolitica strains, 166 E. coli, 90 Shigella sp., and 270 other species. The results showed that 81.8 percent of the Y. pestis strains were lysed, but only one each of Y. pseudotuberculosis and Y. enterocolitica. The remaining 19 genera were resistant to lysis. Susceptibility of Y. pestis to lysis by P3 was dependent on the region of isolation, with the lowest percentage (57.1 percent) of susceptible isolates encountered in Mongolia. These findings do indicate, however, that phage typing of Yersinia pestis may have diagnostic potential. Tables 2; references 7: Russian.

**Novel Rapid Diagnosis Method for Streptococcal Infections**

917C0473C Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 12, Dec 90 (manuscript received 12 Dec 89) pp 22-26

[Article by G. S. Grevnina, I. M. Iontova, A. I. Artyukhov, F. S. Noskov and A. A. Totolyan, Scientific Research Institute of Epidemiology and Microbiology imeni Pasteur, RSFSR Ministry of Health, Leningrad; Scientific Research Institute of Experimental Medicine, USSR Academy of Medical Sciences, Leningrad]

UDC 578.262:579.842.23

[Abstract] A rapid method requiring 5-20 min for completion has been devised for diagnosis of Streptococcus aureus, based on coagglutination of group A specific polysaccharide. The key feature of the methodology consisted of isolation of high specific IgG antibodies by precipitation with 40 percent ammonium sulfate, fractionation on Sephadex G-75 or Sephadex G-200, and salt removal on DEAE-cellulose. These methods of antibody isolation yielded preparations capable of detecting Strep. aureus with a sensitivity of 10E3 cells/ml in coagglutination tests, which is two orders of magnitude greater than the sensitivity obtained with native antiserum. Diagnostic trials in 70 pediatric cases showed that the specificity of the method was on the order of 98-100 percent with a corresponding sensitivity of 94-96 percent. Figures 2; tables 1; references 7: 1 Russian, 6 Western.

**Immunomodulating Actions of Different Protein A Preparations**

917C0473D Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 12, Dec 90 (manuscript received 7 Dec 89) pp 66-69

[Article by K. E. Kondakov, L. N. Semenkova, I. V. Kosarev, V. M. Surovtseva, V. I. Surovtsev and V. G. Galaktionov, Institute of Immunology, USSR Ministry of Medical Industry, Moscow]

UDC 579.861.2:[579.222:579.96].07

[Abstract] Electrophoretic analysis of three commercial preparations of staphylococcal protein A (PA—2 Soviet, 1 Pharmacia (Sweden)) revealed a wide spectrum of proteins, in addition to the 42 kD PA component. Purification on Sephacryl-200 (Sweden) yielded the pure 42 kD PA product. The purified PA and genetically engineered PA behaved identically in enhancing antibody response to SRBC in (CBA + C57BL/6)F<sub>1</sub> mice, increasing phagocytic activity, and in acting as a weak mitogen vis-a-vis B cells. The unpurified PA preparations acted to depress antibody formation 2- to 3-fold, inhibited phagocytosis, and acted as mitogens for T and B cells. Evidently, the effects seen with the unpurified commercial PA preparations are due to contaminant

proteins and do not reflect immunomodulating properties of PA. Figures 3; tables 1; references 13: 3 Russian, 10 Western.

**Immunoenzyme Assay for Staphylococcal Toxic Shock Syndrome Toxin (TSST)**

917C0473E Moscow *ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII* in Russian No 12, Dec 90 (manuscript received 10 Nov 90) pp 70-73

[Article by F. S. Fluyer, G. V. Mikheyeva, P. F. Pozhar and A. K. Akatov, Scientific Research Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow]

UDC 616.9-001.36]-022.7:579.861.2]-078.33

[Abstract] A horseradish peroxidase solid-phase immunoenzyme assay was designed for TSST employing IgG fraction isolated from immunized rabbits. The assay was shown to have a sensitivity of 5-10 ng/ml and absolute specificity in that false-positive reactions were not obtained with enterotoxins of *C. perfringens*, *B. cereus*, heat labile enterotoxin of *E. coli* or staphylococcal enterotoxins A, B, C, D or E when present in concentrations 1000-fold greater than TSST. Analysis of 186 *S. aureus* isolates from patients with toxic shock syndrome and carriers yielded a 52.15 percent positive rate with radial immunodiffusion and an 84 percent positive rate with the immunoenzyme assay, pointing to its clinical utility. Figures 1; tables 2; references 15: 7 Russian, 8 Western.

**Method of Identifying Mycotoxins in Feed Grain**

917C0325 Moscow VETERINARIYA in Russian No 10, Oct 90 pp 57-58

[Article by N. P. Komarnitskaya, I. A. Kurmanov and V. G. Ivanov; All-Union Scientific Research Institute of Veterinary Sanitation]

UDC 619:576.8.097.29:636.0.86.5

[Abstract] A method of simultaneous identification of mycotoxins T-2, F-2, aflatoxin B<sub>1</sub> and sterigmatocystine was described and discussed. Mycotoxins were extracted from grain by chloroform, cleared twice in acetone-hexanum with two-time reextraction in chloroform and on a column with silica gel. Admixtures were eluted from the column by hexane or a hexane and acetone mixture (98:2) and mycotoxins were eluted by a chloroform and acetone mixture (9:1). Mycotoxins eluates were concentrated and eluted from the column by hexane by thin-layer chromatography on Silufol plates. An advantage of the method is that mycotoxins may be identified simultaneously. The clearest eluates of mycotoxins appeared after use of chloroform as an extrahent. Acetone and acetonitril extracted from the grain a large amount of associated admixtures which are difficult to remove by chromatography on a silica gel column. The method was checked on model mixtures of grain and mycotoxins. The limits of detection of T-2, F-2, aflatoxin B<sub>1</sub> and sterigmatocystine was 500, 250, 10-15 and 80-90 µg/kg respectively, and did not differ from results obtained in individual identification. References 10: 5 Russian, 5 Western.

**Novel Antitumor Antibiotics: Novel Analogs and Modifiers and Biological Reactions and Oncogene Inhibitors**

917C0476B Moscow ANTIBIOTIKI I  
KHIMIOTERAPIYA in Russian Vol 36 No 2, Feb 91  
(manuscript received 23 Dec 89) pp 44-48

[Article by M. M. Vyadro and S. M. Navashin, All-Union Scientific Research Institute of Antibiotics, Moscow]

UDC 615.33.017:615.277.3].038

[Abstract] This article reviews recent data from research on the chemical modification and synthesis of novel derivatives of known antitumor antibiotics with the aim of finding effective approaches to the therapy of malignant tumors. Anthracycline antibiotic analogs elevate the activity, decrease the toxicity, and expand the spectrum of action of their counterparts. The most promising of these are the fluorine-containing anthracycline derivatives due to their enhanced antitumor activity and reduced toxicity. An example of this group is 7-O-(2,6-didesoxy-2-fluoro-α-L-talopyranosyl)-pimelyl adriamycinone (ME2303), which in a dose of 100 µg/kg per day increased the average life span by 674 percent,

with a 100 percent survival rate. Research in the field of mitomycin analog synthesis aimed at developing more effective and less myelotoxic derivatives has demonstrated that mitomycin A may be more effective than mitomycin C against tumors. Liblomycin is the most promising of the 227 bleomycin derivatives and is much less toxic to the lungs, but it suppresses myelopoiesis, resulting in leukopenia and thrombocytopenia. Spar-somycin, produced by *Streptomyces sparsogenes*, inhibits protein synthesis at the ribosomal level and has a wide spectrum of biological action. Spargualin is among the biological reaction modifiers that have recently been added to the arsenal of tumor therapy. It is an unusual polyacrylamine-like compound containing spermidine and guanidine. It suppresses the proliferation and differentiation of T-lymphocytes as a result of the diminished activity of DNA polymerase-α in the lymphoid cells. Preliminary findings also suggest that it may find application in the treatment of autoimmune diseases. The oncogene expression inhibitors discussed in this article include erbstatin, an inhibitor of the specific epidermal growth factor receptor which has been shown to extend the average life span by 140-150 percent, and staurosporine, an alkaloid protein kinase inhibitor produced by *Streptomyces actuosus* that potentiates an effect similar to vitamin D<sub>3</sub> on HL-60 myeloleukemia cells and inhibits the proliferation of these cells. References 61: 5 Russian, 56 Western.

**Some Indicators of Reactivity of White Rat Organism After Poisoning by Lethal Dose of Central-Asia Cobra Venom**

917C0574 Ashkhabad IZVESTIYA AKADEMII NAUK  
TURKMENSKOY SSR: SERIYA  
BIOLOGICHESKIKH NAUK No 6, Nov-Dec 90  
pp 31-36

[Article by Ye. N. Aminova, A. T. Berdyeva and S. V. Ronzhina; Turkmen State Medical Institute]

UDC 616-009.4:591.147:591.81

[Abstract] A study of the effect of a single injection of a lethal dose of central-Asia cobra venom on elaboration of adrenal cortex glucocorticoids and the level of formation of glucocorticoid-dependent enzyme tyrosineaminotransferase involved experiments of 90 male mongrel white rats (weight 180-220 g). One group received injection of a physiological solution of sodium chloride in the rear right leg (control group) and the other received cobra venom, diluted in a physiological solution, in a 1 LD<sub>50</sub> dose (0.67 mg/kg). Experiments were performed at the same time each day in order to exclude circadian fluctuations of transferase. Rats were sacrificed within threeto five seconds to exclude the effect of stress. The 11-oxycorticosteroids level in the adrenals and in the blood plasma were determined simultaneously fluorometrically. A lethal dose of venom caused marked reduction of glucocorticoids secretion while tyrosineaminotransferase only began to increase by this time of

intoxication. By the fourth hour after venom injection, the 11-OKS level in both the blood serum and in the adrenals increased more than 4-fold and tyrosineaminotransferase activity reached its maximum value. The study confirmed the relationship between the degree of

increase of tyrosineaminotransferase and the level of elaboration of 11-OKS by the adrenal cortex. Injection of physiological solution caused a rather pronounced stress on the adrenal cortex function as did the venom. Figures 3; references 11: 10 Russian, 1 Western.

**Role of Diethyl Nicotinamide (Cordiamine) in Regulating Peroxide Oxidation of Lipids**

917C0332 Minsk IZVESTIYA AKADEMII NAUK  
BELORUSSKOY SSR: SERIYA BIOLOGICHESKIKH  
NAUK in Russian No 5, Sep-Oct 90 (manuscript  
received 10 Oct 89) pp 107-109

[Article by G. Z. Abakumov, L. F. Legonkova, L. B. Zavodnik et al.; Institute of Biochemistry; BSSR Academy of Sciences]

UDC 612.397.2.547.915-39]015.6:577.164.15

[Abstract] A study of the effect of the structural analog of nicotinamide, diethyl nicotinamide [DINA], on peroxide oxidation processes involved the study of intact rat blood plasma and liver microsomes. Experiments in vivo included injection into male rats of a 73 mg/kg dose of DINA for five days, decapitation of the rats within 24 hours after the last injection and study of the blood plasma and the liver microsomes by a chemiluminescence method. Control rats received injections of 0.9 percent sodium chloride. Healthy volunteers (10 persons) ranging in age from 20-25 received a 25 percent solution of DINA (cordiamine) for eight days at the rate of 250 mg three times a day. Blood was taken 12 hours before and 12 hours after the last dose from the ulnar vein and the blood plasma underwent chemiluminescent analysis. Injection of diethyl nicotinamide in vitro and in vivo reduced the level of hydroperoxides of lipids in blood plasma and rat liver microsomes and in the volunteer's blood plasma. The study confirmed the capacity of DINA to inhibit peroxidation of lipids in microsomes, caused by its interaction with cytochrome P-450. Binding of DINA with cytochrome was evidently not the only mechanism of its antioxidant action since it also suppressed the rapid burst of chemiluminescence in both the microsomes and blood plasma. Figures 1; references 10: 8 Russian, 2 Western.

**Mutual Modulating Effect of Serotonin and Dopamine on Rat Spinal Ganglia Neurons**

917C0454A Kiev NEYROFIZIOLOGIYA in Russian  
Vol 23 No 2, Mar-Apr 91 (manuscript received  
11 Jun 90) pp 168-173

[Article by I. I. Abramets and I. M. Samoylovich, Donets Medical Institute imeni A. M. Gorkiy, Ukrainian SSR Ministry of Health]

UDC 612.829.2:612.822:616-003.725

[Abstract] The individual effects of dopamine and serotonin on  $D_1$ -dopamine and serotonin receptor-mediated responses of neurons elicited by these monoamines were analyzed on the isolated III-V lumbar spinal ganglia of adult rats. In the 63 neurons employed in the study, depolarization responses dominated, with dopamine and serotonin eliciting unidirectional responses in 80 percent of cases. Further investigation involved those neurons

that produced only depolarization responses from both monoamines. The results demonstrated that haloperidol, a non-selective blocker of dopamine receptors, suppressed dopamine and its potentiating effect on serotonin-elicited depolarization responses in the neurons. The serotonin<sub>2</sub> receptor blocker deseril diminished both the depolarization responses of the neurons to the serotonin application and the potentiating effect of serotonin to the dopamine-elicited depolarizing responses in the nerve cells. It was shown that the mutual potentiation of the depolarizing effect of dopamine and serotonin are involved with the activation of the respective types of dopamine- and serotonergic receptors. Moreover, sub-synaptic allosteric modulation at the dopamine- and serotonergic receptor level underlies the mutual potentiation of the effects of the monoamines. These findings also suggest that serotonin- and dopamine-induced depolarization responses of the spinal ganglia neurons result from the intracellular mediators  $CA^{2+}$  and cAMP. Finally, an increase in the  $CA^{2+}$  concentration following serotonin application causes a calcium-calmodulin-dependent phosphorylation of cation channels and facilitates their transition into a conductive status with an increase in intracellular cAMP concentrations under conditions of dopamine receptor activation. Figures 4; references 12: 11 Russian, 1 Western.

**Effect of Nucleus Entopeduncularis Stimulation on Thalamic Motor Nuclei Neurons Under Normal Conditions and After Injury to Nigrostriatal Dopaminergic System Caused by MPTP Neurotoxin**

917C0454B Kiev NEYROFIZIOLOGIYA in Russian  
Vol 23 No 2, Mar-Apr 91 (manuscript received  
3 Aug 90) pp 213-222

[Article by M. Ya. Voloshin, Ye. P. Lukhanina, and B. P. Kolomiyets, Physiology Institute imeni A. A. Bogomolets, Ukrainian SSR Academy of Sciences, Kiev]

UDC 612.826.1:612.822:616-003.725:577.175.859

[Abstract] The effect of a dopamine deficit in the neostriatum on changes in the reactions of ventral anterior (VA) and ventral lateral (VL) neurons that receive afferent nerves from the globus pallidus, or more precisely, its internal segment, which is the chief source of pallidal afferent pathways to the thalamic motor nuclei was investigated in an acute experiment on adult male cats. The experimental group was given a 1 percent solution of N-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP) neurotoxin (5 mg/kg, intramuscularly) every day for five days. The results demonstrated that after an MPTP injection course the inhibitory processes that occur in VA-VL neurons in response to an afferent message from the nucleus (the homolog of the human internal segment of the globus pallidus in cats) are substantially modified in comparison with control animals. MPTP exerts its effect on the brain in a number of ways: 1) it shortens the first inhibition phase; 2) it

lengthens the second phase; 3) it enhances the facilitation that in some cases occurs between the first and second inhibition phases; and 4) it generates several action potentials. These findings suggest that MPTP is a specific neurotoxin that damages primarily the dopaminergic neurons of the substantia nigra. Its introduction to the body results in a decrease in the dopamine concentration in the neostriatum and the development of Parkinsonian symptoms. The results also demonstrate that the membrane potential of the thalamic motor nuclei neurons that receive afferent pathways from the nucleus entopeduncularis is higher in animals that have an impaired nigrostriatal dopaminergic system. It is hoped that electrophysical investigation of those mechanisms for inhibiting thalamic nuclei motor neurons that are under the direct regulation of the dopaminergic system will make it possible to expand current concepts of the role of the nigrostriatal-pallidal system under normal conditions and under conditions of extrapyramidal pathology. Figures 3; references 28: 4 Russian, 24 Western.

**Effect of Catecholaminergic Transmission Insufficiency on Thalamic Ventrolateral Nucleus Neuron Reaction Elicited by Cerebellar and Pallidal Input Stimulation**

917C0454C Kiev NEYROFIZIOLOGIYA in Russian Vol 23 No 2, Mar-Apr 91 (manuscript received 4 Oct 90) pp 222-231

[Article by Ye. P. Lukhanina, Physiology Institute imeni A. A. Bogomolets, Ukrainian SSR Academy of Sciences, Kiev]

UDC 612.826.1:612.8.015.3

[Abstract] The effect of the systemic administration of typical neuroleptics with a distinct cataleptogenic effect—haloperidol (dopamine- $D_2$  receptor blocker, 1-2 mg/kg) and droperidol (central  $\alpha$ -adrenergic receptor blocker, 0.5-1 mg/kg) on the reaction of ventral lateral (VL) neurons caused by stimulation of their chief afferent nerves was investigated in 22 chronic experiments on four cats, involving a total of 239 VL neurons. It was found that in haloperidol- and droperidol-induced impairments in catecholaminergic transmission, the excitatory reactions of the neurons to stimulation of the cerebellar fibers is characterized by irregularity in the onset and variability of the latent period. In addition, there was a rise in the biphasic inhibitory responses separated by the excitatory phase in contrast to control experiments, where single phase inhibitory reactions prevailed in the reacting cells. These results suggest that aspects of VL neuron reactions in experimentally induced catecholaminergic transmission insufficiency stem from the spread of hyperpolarization processes in these cells in comparison with their status in control animals. Furthermore, in instances of central catecholaminergic transmission insufficiency, the conditions are set for the development of a hyperpolarized condition of

the thalamic motor nuclei neurons, which modifies the nature of the information entering the motor cortex through the thalamus and is likely one of the mechanisms of the onset of extrapyramidal motor impairments. Figures 6; references 31: 5 Russian, 26 Western.

**Investigation of Cardio- and Hemodynamic Reactions in Response to Administration of GABA to Neuronal Structures in Ventrolateral Region of Cat Medulla Oblongata**

917C0457A Kiev FIZIOLOGICHESKIY ZHURNAL in Russian Vol 37 No 1, Jan-Feb 91 (manuscript received 12 Mar 90) pp 18-24

[Article by L. N. Shapoval, L. S. Pobegaylo, and V. F. Sagach, Physiology Institute imeni A. A. Bogomolets, Ukrainian SSR Academy of Sciences, Kiev]

UDC 612.181.2:612.172

[Abstract] The aspects of cardio- and hemodynamic reactions elicited by GABA injections into the neuronal structures of the rostral and caudal ventrolateral region of the medulla oblongata were investigated in 21 cats. All of the animals were administered  $1 \times 10^{-5}$  -  $5 \times 10^{-6}$  mol/l GABA; some also received  $2.7 \times 10^{-6}$  -  $13.5 \times 10^{-5}$  mol/l bicuculline. The results demonstrated that GABA injections into the neuronal structures 0.5-1.5 mm rostral to the XII cranial nerves elicited a 46.6 percent decrease in systemic arterial pressure, a 22 percent drop in pulse, and a 31.9 percent decrease in systolic pressure in the left ventricle. On the other hand, GABA injections to the caudal area at the level of the XII cranial nerves elevated systemic arterial pressure by 47.7 percent and the pulse by 21.6 percent. Bicuculline injections exhibited an effect directly opposite that of GABA. In conclusion, these findings indicate that GABA-sensitive neuronal structures that help regulate cardio- and hemodynamics are not uniformly distributed in the ventrolateral region of the medulla oblongata in the cat and that the neuronal structures closest to the XII cranial nerves are the most sensitive to GABA. Figures 4; references 15: 6 Russian, 9 Western.

**Glucocorticoid Control of Transmitter Processes in Brain Structures in Rapid Adaptation**

917C0458 Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA in Russian Vol 76 No 9, Sep 90 pp 1209-1215

[Article by M. Yu. Tayts, T. V. Dudina, T. S. Kandybo, and A. I. Yelkina, Laboratory of Physiology of the Vestibular System, Institute of Physiology, BSSR Academy of Sciences, Minsk]

UDC 612.017.2+612.118.2

[Abstract] The body's reaction to extreme conditions, such as vibration, involves visceral and somatic afferent systems that send signals that converge on neurons of the

hypothalamus and include a powerful adaptational system such as corticoliberin-corticotropin-corticosterone, which ultimately results in stressor increase in corticosteroid levels in the blood. Higher corticosteroid levels, however, lead to an alteration of monoamine levels in the brain and to the sensitivity of their synaptic receptors. The researchers here studied the activity of stimulatory and inhibiting glucocorticoid-dependent neurotransmitter processes. The processes ranged from the most common in the central nervous system (GABA-ergic processes) to monoaminergic and glycinergic processes in the parietal region of the cerebral cortex and the lateral vestibular nuclei, which specifically respond to vibrational loading, as well as in structures responsible for involving the hypophysis-adrenal cortex system in the stress response. The experimentation involved Wistar rats separated into six groups: (1) control, (2) those undergoing bilateral adrenalectomy, (3) those injected intraperitoneally with hydrocortisone acetate, (4) intact animals exposed to vibrations for two hours, (5) adrenalectomized animals exposed to vibrations for two hours, and (6) animals injected with hydrocortisone acetate and exposed to vibrations for two hours. The researchers found that triggering of the proper neurotransmitter mechanisms of rapid adaptation in specific and nonspecific structures of the brain responsible for regulation of a number of autonomic functions is possible only with a sufficiently high glucocorticoid content in the body and an appropriate level of receptor binding of the glucocorticoids. Figures 3; references 16: 11 Russian, 5 Western.

#### **Dependence of Human Psychophysiological Reactions on Space and Time Organization of Proprioceptive Stimuli**

917C0475A Moscow FIZIOLOGIYA CHELOVEKA  
in Russian Vol 17 No 1, Jan-Feb 91 (manuscript  
received 23 May 89) pp 45-52

[Article by M. Ya. Kelmovich, P. V. Mamkin and V. P. Shuplyak, Institute of Experimental Medicine, USSR Academy of Medicine, Leningrad]

UDC 612.745.5

[Abstract] A topographical assessment was conducted on changes in body temperature in relation to spatiotemporal features of local muscular exertions in the case of 15 males, 24 to 37 years old. The exertions, represented less than 10 percent of maximum effort, involved 2 second contractions of the following muscle groups: chest muscles, interscapular muscles, abdominal press, lumbar area, lower abdomen and sacral muscles. The results showed that an ascending order of contractions led to an increase in cutaneous temperature at most sites ( $P < 0.01$ ), with the exception of feet and palms. A descending order resulted in reduced temperatures ( $P < 0.01$ ), again with the exception of the extremities. Random contractions were accompanied by insignificant variations in skin temperature. Accordingly, the

results demonstrated that a combination of weak local proprioceptive signals into a spatiotemporal pattern leads to their transformation into a sensory signal with a systemic effect. Evidently, lability gradients are generated at the corresponding segments of the spinal cord which affect body temperature regulation, a phenomenon that may be mediated by the reticular formation. Figures 3; tables 2; references 11: Russian.

#### **Human and Animal Response to Hypoxia in Relation to Autonomic Typology**

917C0475B Moscow FIZIOLOGIYA CHELOVEKA  
in Russian Vol 17 No 1, Jan-Feb 91 (manuscript  
received 14 Mar 88; in final form 6 Jun 90) pp 95-103

[Article by F. V. Osminin, Ye. I. Baranova, A. F. Yershov, Yu. A. Ryabchuk, A. P. Pisanko and V. A. Nibush, Scientific Research Institute of Biology and Biophysics, Tomsk]

UDC 612.273+612.822.3

[Abstract] Physiological parameters and blood chemistries were monitored in a group of 75 men, 22 to 27 years old, in order to assess their responsiveness to pressure chamber-simulated hypoxia (3500 m; 1 h) in relation to autonomic typology. The results showed that individuals classified as parasympathotonic tolerated hypoxia best with the least deterioration of physical endurance and full oxygen saturation of the arterial blood immediately after hypoxia. Sympathotonic subjects overreacted to hypoxia with enhancement of inotropic cardiac function, vasodilation of cerebral arteries and overoxygenation of arterial blood. Finally, mesotonic individuals presented with an inadequate response due to discordance of cardiac and respiratory activities, marked loss of physical endurance during hypoxia, and slow recovery of arterial oxygenation. Histopathologic examinations of outbred rats after 1 h in a pressure chamber at 7000 m provided experimental confirmation for the mechanisms involved. Sympathotonic rats presented with increased permeability and perivascular edema of the pial blood vessels, while cerebrovascular stasis was the dominant finding in mesotonic rats. Parasympathotonic rats were unremarkable. Figures 2; tables 2; references 30: 28 Russian, 2 Western.

#### **Enhancement of Athletic Performance by Plant Products "Valday" and "Altair"**

917C0475C Moscow FIZIOLOGIYA CHELOVEKA  
in Russian Vol 17 No 1, Jan-Feb 91 (manuscript  
received 22 Nov 89) pp 120-125

[Article by A. S. Solodkov, S. S. Mikhaylov, D. N. Davidenko, T. A. Zinchenko and E. A. Faktor, Institute of Physical Culture imeni P. F. Lesgaft, Leningrad]



UDC 612.821.392

[Abstract] Further trials were conducted with plant adaptogens Valday and Altair. Both products are available as water-soluble powders and are used as invigorating drinks. Valday consists of trace elements and small quantities of amino acids and extracts of aromatic plants and antioxidants. Altair contains all the essential amino acids, polyphenols and glycosides. Trials with 19- to 22-year-old male athletes (runners, swimmers, skaters) showed that both preparations improved physical performance on ergometric bicycles after a 10 day course of treatment (20 g b.i.d. Valday; 30 g/day Altair). In addition, the time required for a 1000 m dash was reduced 6.6 percent in the Valday group and 6.3 percent in the Altair group. Monitoring of the cardiovascular system and clinical chemistries indicated that both preparations alleviated stress-induced metabolic shifts, including lipid peroxidation, but that Altair was a more potent factor. On balance, the data indicated that Valday acts preferentially to enhance the speed with which functional reserves are engaged to support performance, whereas Altair appears to enhance efficiency of their utilization. Tables 4; references 8: Russian.

### Occupational Performance in Arid Regions

917C0475D Moscow FIZIOLOGIYA CHELOVEKA  
in Russian Vol 17 No 1, Jan-Feb 91 (manuscript  
received 15 Sep 89) pp 132-139

[Article by G. N. Sadikov, P. G. Koloyarov and V. I. Lavrinenko, Institute of Arid Zone Physiology and Experimental Pathology, Turkmen SSR Academy of Sciences, Ashkhabad]

UDC 612.821:613.693

[Abstract] Sensorimotor and mnemonic functions were assessed in the case of 44 males working at a gas drilling operation. The 24- to 35-year-old subjects were employed in southeastern Karakum, an ideal area for evaluation of the effects of a hot climate on these parameters. For purposes of the study the subjects were divided into sensory (control panel operators) and somatosensory (field workers) groups. Analysis of visual and operational memory and operational and reproductive thinking in spring and summer demonstrated that cognitive functions (operative memory, reproductive thinking) were less adversely affected by the ambient climate than sensorimotor performance. This fact was interpreted to indicate flexible adaptive responses representing the phenomenon of 'second type artificial stable functional connections' [Smirnov & Borodkin, Fiziol. Cheloveka, 1: 252, 1975], which has been implicated in stable mnemonic performance. Tables 4; references 19: 15 Russian, 4 Western.

### Endocrine and Immune Changes in Man at Low Temperatures

917C0475E Moscow FIZIOLOGIYA CHELOVEKA  
in Russian Vol 17 No 1, Jan-Feb 91 (manuscript  
received 9 Jan 89) pp 158-163

[Article by T. V. Petrova, I. P. Bobrovnikitskiy and Yu. A. Goltsev, Moscow]

UDC 612.01.04-578.087.9

[Abstract] Extensive monitoring was performed on two groups of men in order to assess the impact of extremely low temperatures on endocrine and immune indicators. Group I consisted of eight men, 25 to 42 years old, engaged in a 26 day 850 km ski run in the Far North with air temperatures ranging from -25 to -40°C. Biochemical monitoring of Group I subjects revealed a statistically significant increase in blood cortisol and  $\beta_2$ -microglobulin ( $P < 0.05$ ), and a fall in insulin concentration. The increase in the cortisol:insulin ratio in this cohort was interpreted to indicate a maximum demands on the adaptive mechanism. Other biochemical indicators pointed to enhanced lipolysis in conjunction with inhibition of carbohydrate metabolism. Group II was represented by five men of an equivalent age span subjected to a 20 day stay in an improvised shelter at a more moderate latitude. Outside air temperature ranged from -30 to 0°C and inside the shelter from -7 to 0°C. In this group the predominant findings consisted of depressed  $\beta_2$ -microglobulin, cAMP, cGMP, cortisol, and insulin. The cAMP:cGMP ratio was increased and the cortisol:insulin ratio depressed. In addition, a 6 km excursion out of the shelter resulted in elevation of the IgE concentration ( $P < 0.05$ ). These findings were taken to indicate considerable demand on adrenergic mechanisms and lability of the immune system. In addition, the change in the cortisol:insulin ratio was felt to be consistent with gradual adaptation to the environment. In both groups, regardless of the level of physical activity, energy metabolism shifted to predominant utilization of lipids. Nevertheless, the combination of extreme cold and physical exertion was seen to be more stressful than cold alone. Tables 2; references 18: 8 Russian, 10 Western.

### Psychophysiological Characteristics of Individuals Differing in Heat Tolerance in Initial Stages of Adaptation to Hot Climates

917C0475F Moscow FIZIOLOGIYA CHELOVEKA  
in Russian Vol 17 No 1, Jan-Feb 91 (manuscript  
received 3 May 89) pp 183-186

[Article by V. P. Kovalenko, V. P. Natalenko and S. T. Posokhova, Military Medical Academy imeni S. M. Kirov, Leningrad]

UDC 612.

[Abstract] Psychophysiological assessment was performed on 28 men, 18 to 20 years old, during a three

month stay in Ashkhabad with ambient temperatures of 43-45°C. For most this represented the first exposure to this type of climate. For purposes of the study the subjects were divided into heat hypertolerant and hypotolerant groups, based on their performance on a 25 min 40 cm step test in terms of rectal temperature and heart rate. Personality assessments of the two groups showed that hypotolerant subjects manifested greater insecurity, inclination to depression, dependency on others in decision-making and greater societal awareness than did the hypertolerant subjects. Nevertheless, the hypotolerant individuals enjoyed greater authority among peers and were more likely to elicit sympathy than the hypertolerant individuals. These observations indicate that a physical test, in this case a step test, may be used to assess personality differences in the initial stage of adaptation to a hot climate. Adaptation strategies to heat of the hypotolerant groups was described as 'subjective' in nature. The hypertolerant subjects were characterized by 'objective' adaptation strategies. The former seem to be motivated by a greater sense of self-preservation and complained of heat during testing, whereas the latter subjects concentrated on task accomplishment at the expense of personal discomfort. Tables 1; references 8: Russian.

**Effect of Low-Frequency Vibration on Gamma-Amino-Butyric Acid in Some Brain Structures**

917C0576A Kiev *FIZIOLOGICHESKIY ZHURNAL*  
in Russian Vol 37 No 2, Mar-Apr 91 pp 3-7

[Article by M. I. Safarov and S. A. Kerimov; Institute of Physiology imeni A. I. Karayev; AzSSR Academy of Sciences; Baku]

UDC 534.1:577.44+612.82:577.17

[Abstract] A study of the effect of low-frequency vibration on the level of free gamma-amino-butyric acids [GABA], Glu and Asp and on activity of glutamate carboxylase (GDK; EC 4.1.1.15) and GABA-transaminase (GABA-T; EC 2.6.1.19) in the cerebral hemispheres, cerebellum and brain stem involved experiments on 150, 200-250 g male mongrel rats. Rats underwent the effect of horizontal vibration (20 Hz, amplitude 0.4 mm) for 30 minutes, seven hours (break every four hours for one hour) and one month (daily for seven hours except on non-working days). Control rats experienced only the sound effect from a vibrator. Low frequency vibration, regardless of the duration, increased the GABA level and glutamate decarboxylate level in the cerebral hemispheres, cerebellum and brain stem in the rats. Shifts after 30 minutes of vibration were more pronounced than were those after seven hours and 30 days of exposure to vibration. Levels of glutamic acid and aspartic acid increased under the effect of 30 minutes vibration but decreased under the effect of seven days and one month of vibration. The study confirmed

the fact that GABA, in stress situations, plays a significant role in brain activity. An optimal increase of GABA level ensures protection of nerve cells from harmful external effects, in this case, low-frequency vibration, by creating protective inhibition. References 11: 8 Russian, 3 Western.

**Effect of Leu- and Met-Enkephalines on Activity of Adenosine Desaminase and 5'-Nucleotidase of Lymphocytes Under Conditions of Stress Stimulation of Metastasis**

917C0576B *FIZIOLOGICHESKIY ZHURNAL*  
in Russian Vol 37 No 2, Mar-Apr 91 pp 54-60

[Article by Z. O. Nadiradze, V. Yu. Umanskiy, Yu. P. Shmalko and A. G. Gachechiladze; Institute of Problems of Oncology imeni R. Ye. Kavetskiy; UkSSR Academy of Sciences]

UDC 616.24-006.6-033.2-089.87-089.168-07:616.155.32-008.933.57-074

[Abstract] A study of activity of key enzymes of metabolism of adenosine, adenosine desaminase and 5'-nucleotidase in the lymphocytes and thymus of mice with metastasing Lewis carcinoma during pharmacological correction of the stress-producing mechanism with the use of leu- and met-enkephalines involved experiments on 410 C57BL male mice (weight 25-30 g). Tumor cells ( $2 \times 10^5$  in 0.5 ml of physiological solution) were placed under the foot pad and the foot was resected near the knee joint on the 14th day after tumor transplantation. Use of the Desiderato method produced three hours of stress two days after the operation. Leu- and met-enkephalines were injected intravenously (1 mg/kg) one day before tumor removal and on the following five days. The effect of leu- and met-enkephalines on stress-producing mechanism in the mice differed because of their opposite effect on development of tumor metastasis. Leu-enkephaline inhibited tumor metastasis while met-enkephaline stimulated metastasis in the lungs. The inhibiting effect of leu-enkephaline arose, largely, from the stimulating effect on the activity of thymus lymphocytes and reduction of functional activity of lymphocytes in the spleen. References 15: 7 Russian, 8 Western.

**Types of Reactions of Cardiac Rhythm to Oxygen and the Efficiency of Human Adaptation to High Mountains**

917C0671A Dushanbe *ZDRAVOOKHRANENIYE TADZHIKISTANA* in Russian No 6, Nov-Dec 90 pp 66-68

[Abstract of article by F. A. Shkurov and L. A. Prishchepa; Department of Normal Physiology, Tadzhik Abuali ibn Sino State Medical Institute]

[Abstract] Investigations were carried out on individual adaptability to high-mountain conditions to determine types of cardiac rhythm reaction compared with work

efficiency. The former were tested by examining cardiac intervals during breath-holding and given various physical loads in a pure oxygen environment. The subjects (33 men, 18 to 22 years of age) were evaluated for symptoms of altitude sickness under alpine conditions, and divided into well-adapted and poorly-adapted groups. Fitness for work was evaluated by the PWC<sub>170</sub> test. The reaction types under these were compared under low- and high-mountain conditions there were three types of changes in the reactions. The highest work

capacity was found in individuals with slowed pulse rate [PR] during breath-holding; the lowest in those with accelerated PR. A difference in reaction was found at the 100 Wt load (but not at the 70 Wt), with PR remaining unchanged in pure O<sub>2</sub> in 67 percent of well-adapted, and only 37 percent of poorly-adapted individuals. At the lower work load most of the poorly-adapted individuals did not respond to O<sub>2</sub>, whereas almost all the well-adapted did. These findings can be used in selecting individuals for alpine work. References 8: Russian

**Generation and Comparative Studies of Highly Reproductive Influenza A Recombinants With High Avidity Hemagglutinin**

917C0432A Moscow VOPROSY VIRUSOLOGII  
in Russian Vol 35 No 6, Nov-Dec 90 (manuscript  
received 4 Apr 90) pp 458-461

[Article by I. P. Manova, S. V. Kolotvinov, I. N. Zhilinskaya and V. P. Sukhin, Medical Institute, RSFSR Ministry of Health, Sverdlovsk; All-Union Scientific Research Institute of Influenza, USSR Ministry of Health, Leningrad]

UDC 578.832.1:578.5].08

[Abstract] Co-cultivation in chick embryos was employed for the construction of influenza A (H3N2, H3N1) viruses combining efficient reproduction with hemagglutinin with high avidity for antibodies. Recombination of the highly reproductive virus A/PR/8/34(H1N1) with high-avidity but low reproductive potential aSV27.123(H3N2) virus led to isolates combining both traits. Morphological features reflected parental types, but morphology was unrelated to avidity due to transmission of hemagglutinin H3 gene. In addition, avidity was also shown to be unrelated to replication at different temperatures, susceptibility to inhibitors, and elution from sheep red cells. These findings indicate that viral avidity for antibodies is under the control of the hemagglutinin gene, although the involvement of other genes cannot be excluded. Tables 2; references 18: 11 Russian, 7 Western.

**Detection of Influenza A Virus RNA by Northern Blots Using Biotin-Labeled Probes**

917C0432B Moscow VOPROSY VIRUSOLOGII  
in Russian Vol 35 No 6, Nov-Dec 90 (manuscript  
received 3 Jan 90) pp 464-466

[Article by L. V. Uryvayev, Ye. A. Rusakavskaya, N. M. Sinagatullina, L. Z. Fayzullin, Yu. Yu. Vengerov, N. A. Parasyuk, K. S. Ionova, N. N. Veyko, D. M. Spitkovskiy and A. V. Karpukhin, Institutes of Virology imeni D. I. Ivanovskiy and of Medical Genetics, USSR Academy of Medical Sciences; Scientific Center for Development and Implementation of Molecular Diagnostics, Moscow]

UDC 578.8:578.223].08

[Abstract] Comparative Northern blots were performed to assess the sensitivity and specificity of methods using <sup>32</sup>P- and biotin-labeled DNA probes. The probes consisted of plasmid pIM-25 DNA bearing a full-length DNA segment encoding M<sub>1</sub> matrix protein. Trials with total cytoplasmic RNA isolated from MDCK cells infected with influenza viruses A/USSR/90/77 (H1N1) and A/Texas/77 (H3N2) showed that both probes were equivalent as to sensitivity and specificity, detecting RNA concentrations corresponding to 4.5 to 5.5 log ID<sub>50</sub> units of virus in 2 x 10E4 cells. These observations

indicate the potential usefulness of biotin-labeled probes as safe reagents with long shelf-lives. Figures 2; references 12: 6 Russian, 6 Western.

**Molecular Polymorphism of NS1 Protein: Primary Component of Soluble (Nonviral) Antigen of Tick-Borne Encephalitis Virus (TBEV)**

917C0432C Moscow VOPROSY VIRUSOLOGII  
in Russian Vol 35 No 6, Nov-Dec 90 (manuscript  
received 11 Dec 89) pp 471-474

[Article by T. S. Gritsun, V. N. Lyapustin, A. G. Shatalov and V. A. Lashkevich, Institute of Poliomyelitis and Viral Encephalitis, USSR Academy of Medical Sciences, Moscow]

UDC 578.833.26:[547.74:578.224

[Abstract] Extensive studies were conducted on the NS1 (p47) protein of soluble (nonviral) antigens of TBEV, using immunoblotting, rocket immunoelectrophoresis and polyacrylamide gel electrophoresis (PGE) in combination with heating (100°C; 5 min) and chemical dissociating agents (SDS, 8 M urea, β-mercaptoethanol). The results led to the conclusion that NS1 is the major antigenic component of the soluble antigen and its monomeric form is a linear polypeptide with a carbohydrate moiety. The NS1 glycoprotein is readily discernible on 10 and 20 percent PGE. As a component of the soluble antigen fraction NS1 appears to undergo association into dimers and oligomeric circular structures. Figures 3; references 15: 9 Russian, 6 Western.

**Differentiation of Tick-Borne Encephalitis Virus (TBEV) Strains by Molecular Hybridization With Synthetic Deoxyoligonucleotides**

917C0432D Moscow VOPROSY VIRUSOLOGII  
in Russian Vol 35 No 6, Nov-Dec 90 (manuscript  
received 18 Sep 89) pp 474-478

[Article by V. A. Shamanin, A. G. Pletnev and V. I. Zlobin, Institute of Bioorganic Chemistry, Siberian Department, USSR Academy of Sciences, Novosibirsk; Institute of Epidemiology and Microbiology, Eastern Siberian Branch, USSR Academy of Medical Sciences, Irkutsk]

UDC 578.833.26.083.2

[Abstract] A panel of 11 synthetic deoxyoligoribonucleotides complementary against different regions of the TBEV Sophia strain genome were used in studies on the differentiation of various TBEV strains isolated from different geographic regions. The Northern blots demonstrated considerable heterogeneity among the isolates, both as to geographic regions and hosts. However, isolates from humans tended to react with more probes than did isolates from ticks, regardless of the geographic area. This fact suggests that similarity to the Sophia

strain may increase pathogenicity of TBEVs for humans. Figures 1; tables 3; references 17: 4 Russian, 13 Western.

# **Immunogenicity and Stability of Inactivated Japanese B Encephalitis Virus (JEBV) Vaccine**

917C0432E Moscow VOPROSY VIRUSOLOGII  
in Russian Vol 35 No 6, Nov-Dec 90 (manuscript  
received 29 Jan 90) pp 478-480

[Article by M. K. Khanina, N. G. Bochkova, V. P. Grachev, L. B. Elbert, M. S. Vorobyeva, E. A. Borsuk and V. V. Pogodina, Institute of Poliomyelitis and Viral Encephalitides, USSR Academy of Medical Sciences; State Scientific Research Institute of Standardization and Quality Control of Biological Preparations imeni L. A. Tarasevich, Moscow]

UDC 615.372:547.833.1]-015.46.07

[Abstract] Immunogenicity and stability testing was conducted on six lots of an inactivated Soviet JEBV vaccine prepared in Syrian hamster kidney cell cultures. Immunization of mice with the formalin-inactivated vaccine and testing against Nakayama-NIH and Jagar-01 strains as the antigen yielded antibody titers in the range of 1:80 to 1:320 in PHI tests. Equivalent results were obtained in neutralization tests and the lots were observed to be areactogenic and nontoxic. Titers fell on storage at 4-6°C for two to three years in direct proportion to storage time and initial titers. Three lots with initial PHI titers of 1:320 fell to 1:40 to 1:80 against Nakayama-NIH after three years; lots with lower initial titers became inactive. Highest immunogenicity was retained by a lot with an initial JEBV concentration in the culture supernatant of 8.0 log LD<sub>50</sub>/ml. The antibody response was lower when tested with Jagar-01 than with Nakayama-NIH, although the former predominates in the epidemiologic picture in Japan and China. Tables 3; references 8: 7 Russian, 1 Western.

# **Recombinant Monoclonal Antibodies (RMA) Against Lassa Virus: Formation of Reactive Paratopes**

917C0432F Moscow VOPROSY VIRUSOLOGII  
in Russian Vol 35 No 6, Nov-Dec 90 (manuscript  
received 9 Nov 90) pp 488-492

[Article by A. S. Vladiko, L. Ya. Kunitskaya, A. G. Krasko, S. I. Bystrova, N. S. Pyzhova and I. S. Lukashovich, Belorussian Scientific Research Institute of Epidemiology and Microbiology, Belorussian SSR Ministry of Health, Minsk]

UDC 616.98:578.833.26]-07:616.153.96-078.33

[Abstract] Immunochemical studies were conducted on RMAs against Lassa virus prepared by fusion of mouse splenocytes with myeloma X-63 cells, including activity determinations by solid-phase immunoenzyme assay. The results demonstrated that the RMAs were produced

by recombinations occurring at both the level of heavy chains yielding heteroisotypic RMAs, as well as at the light chain levels to produce homo- and heteroisotypic RMAs. The six lots were characterized by the following immunochemical formulas: H2L2, HγLκ, H2Lκ, and HγLκ. These heavy and light chain combinations yielded RMAs with valencies of 0.5, 1 and 2. Radioimmunoprecipitation assays demonstrated that the RMAs were directed against the NP protein of the Lassa virus. Figures 3; tables 1; references 20: 3 Russian, 17 Western.

# **Etiologic Significance of Hantaan Virus Serotypes (HVS) in Hemorrhagic Fever With Renal Syndrome (HFRS) in Soviet Far East**

917C0432G Moscow VOPROSY VIRUSOLOGII  
in Russian Vol 35 No 6, Nov-Dec 90 (manuscript  
received 5 Apr 90) pp 492-494

[Article by T. I. Astakhova, R. A. Slonova, Ye. A. Tkachenko, A. N. Bondarenko, M. Ye. Kosoy and Ye. L. Kushnarev, Scientific Research Institute of Epidemiology and Microbiology, Siberian Department, USSR Academy of Medical Sciences, Vladivostok; Institute of Poliomyelitis and Viral Encephalitides, USSR Academy of Medical Sciences, Moscow]

UDC 616.61-002.151-078.73(571.6)

[Abstract] Testing was conducted on 344 serum samples collected in 1984-1989 from patients with HFRS to determine the predominant HVS in Primorskiy Kray. Indirect immunofluorescence and neutralization tests implicated serotype 1 isolated from field mice as the dominant etiologic factor. Evidence was also obtained for the clinical significance of serotype 3 isolated *Rattus norvegicus* and serotype 5 isolated from *Clethrionomys rufocanus*. Finally, very low titers with serotype 4, isolated from the reed vole, raised doubts as to its importance in HFRS in the Soviet Far East at the present time. Tables 2; references 10: 4 Russian, 6 Western.

# **Induction of Nonspecific Immunosuppression by Combined Injection of Newcastle Disease Virus (NDV) and Cyclophosphamide (CP)**

917C0432H Moscow VOPROSY VIRUSOLOGII  
in Russian Vol 35 No 6, Nov-Dec 90 (manuscript  
received 9 Nov 89) pp 494-497

[Article by T. K. Kondatyeva, N. V. Mikheyeva, T. V. Mamontova, A. I. Kognovitskaya, L. N. Fontalin and T. G. Orlova, Scientific Research Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Sciences, Moscow]

UDC 616.98:578.831.1]-092.9-078.33

[Abstract] NDV was demonstrated to possess mitogenic activity in studies with splenocytes of male, 18-20 g (CBA x C57Bl/6)F<sub>1</sub> mice, which predispose a host to autoimmune pathogenic processes. Studies on intact

animals demonstrated slight enhancement of antibody response to SRBC by i. v. administration of NDV, whereas administration of CP depressed antibody formation 2-fold. A 20-fold reduction in the antibody response to SRBC by treating the mice with NDV in combination with 200 mg/kg of CP 24 h later. In addition, whereas NDV alone did not affect development of delayed hypersensitivity to SRBC and CP alone had a slightly depressive effect, combination of NDV and CP completely prevented SRBC delayed hypersensitivity. Studies on antibody formation against LPS, a thymus-independent antigen, showed that NDV was without effect, while the combination of NDV + CP was much more immunosuppressive than CP alone. The putative mechanism underlying the immunosuppressive action of the NDV and CP combination appears to involve initial stimulation of T and B cells by NDV, rendering them susceptible to CP. Figures 3; tables 1; references 11: 4 Russian, 7 Western.

**Rapid Analysis of Viral Antigens in Cesium Chloride Gradients by Coagglutination Reaction**

917C0432I Moscow VOPROSY VIRUSOLOGII  
in Russian Vol 35 No 6, Nov-Dec 90 (manuscript  
received 29 Dec 89) pp 513-515

[Article by V. I. Khustov, Yu. A. Kazachkov and M. B. Korolev, Institute of Poliomyelitis and Viral Encephalitis, USSR Academy of Medical Sciences, Moscow]

UDC 578.74:083.3:546.36

[Abstract] Coagglutination studies on cesium chloride gradients (1.25-1.45 g/cm<sup>3</sup>) following ultracentrifugation of cell lysates infected with monkey rotavirus SA-11 or hepatitis A virus HAS-15 demonstrated that this approach provided a rapid analytical method for viral

antigens. The results were confirmed by immunoenzyme assays and electron microscopy, with the specificity and sensitivity rivaling those obtained with immunoenzyme assays. However, whereas the immunoenzyme assays require one to two days of incubation, coagglutination yields results in 2-4 h and obviates the need for expensive instruments and reagents. Figures 2; references 11: 5 Russian, 6 Western.

**Cultivation of Primary and Continuous Animal Cell Lines on Soviet Microcarriers**

917C0432J Moscow VOPROSY VIRUSOLOGII  
in Russian Vol 35 No 6, Nov-Dec 90 pp 515-518

[Article by R. Ya. Podchernyayeva, A. V. Tkachenko, V. A. Isachenko, O. P. Buadze, V. Yu. Pestova and V. P. Derevyanko, Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow]

UDC 616-018.1-02:578.8]-092.4-07

[Abstract] Several Soviet microcarriers were tested for their suitability in cultivation of continuous 4647 and primary chick embryo (PCE) cell lines in comparison with the results obtained with Cytodex-3 (cross-linked dextran; Pharmacia, Sweden). Analysis of growth kinetics and electron microscopy showed that the highest index of proliferation (5-6) was obtained with cytopol (tsitopol; gelatin-coated polyvinyl; Leningrad, USSR). Two other Soviet microcarriers, MNK (collagen granules; Moscow, USSR) and cytolar (tsitolar; denatured collagen; Olayne, USSR) were less efficient. Best growth of PCE cells was obtained with medium 199 supplemented with 10 percent heated bovine serum (HBS), while 4647 cells grew best in Eagle's medium containing RPMI (1:1) and 8 percent HBS. Figures 3; references 20: 5 Russian, 15 Western.

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